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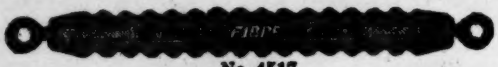

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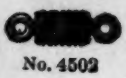

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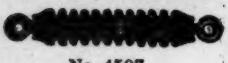

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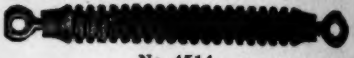

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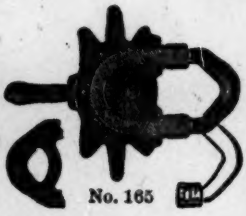

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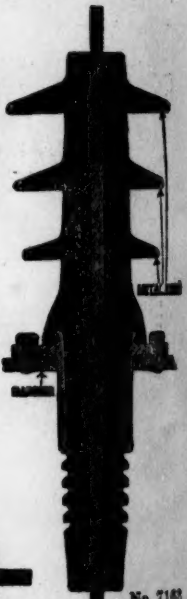

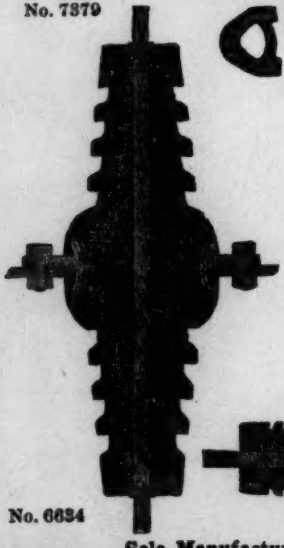

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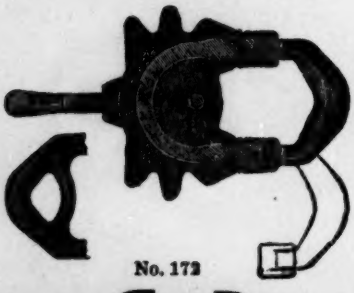

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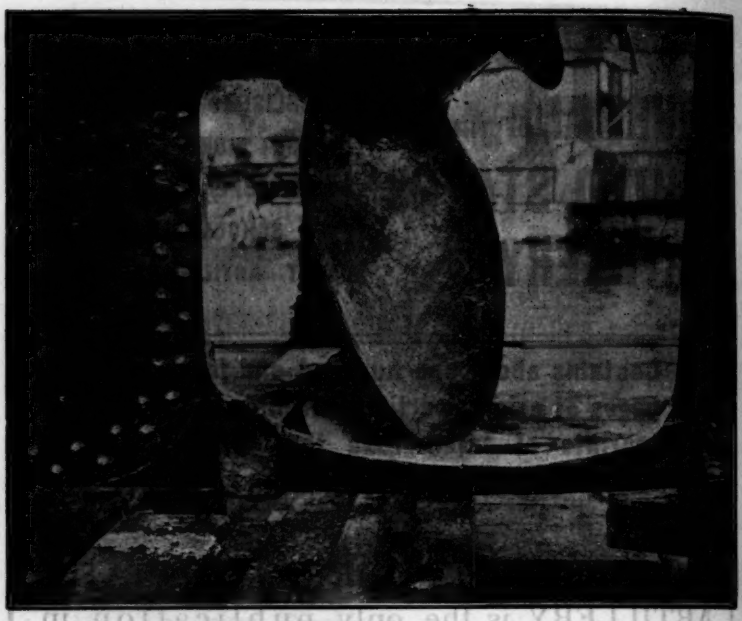

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SANTA BARBARA

THE PATRONESS OF THE NAVAL BUREAU OF ORDNANCE

By Rear Admiral Ralph Earle, U. S. Navy

In the office of the chief of naval ordnance, at Washington, D. C., there hangs a handsome portrait of Santa Barbara, the patron saint of ordnance, which was presented to the bureau by Rear Admiral William M. Folger, U. S. N., chief of the bureau from February, 1890, to January, 1893.

Many inquiries as to why the picture is displayed so prominently and as to what it means are made by visitors, both officers and civilians. The search for the real legend was not as simple as had been thought. Believing, therefore, that the result of such an inquiry may be of interest to the service, the bureau asked Mr. Alan S. Hawkesworth, F. R. S. A., to write the story of the beautiful Saint Barbara. Her tragic and short life is set forth by him as follows:

In the Roman, the Greek, and the Russian calendars, the feast-day of "Saint Barbara, Virgin and Martyr," is celebrated on December 4, the presumed anniversary of her martyrdom. The details of her legendary life and death, which are acknowledged to be mythical, are given by the Bellandists, and other authorities. She is said to have lived at the close of the third and beginning of the fourth century, and to have paid for her faith by her life during the great Diocletian persecution, in 306 A. D., although the

very first mention of her story is in the Frankish Martyrologies of the seventh century. Earlier church historians and martyrologists, who lived nearer in time and in place to the supposed martyrdom, know nothing of the tale, which owes its origin to the romantic imagination of a people of a wholly different race, age, and country, living 400 years after its supposed date, and weaving a "geste" filled with familiar features of folk- and fairy-tale.

No agreement, even, is reached as to the city of her death, nor the Roman emperor in whose reign she suffered. Heliopolis in Egypt (On), or in Coelo-Syria (Baalbek), Nicomedia, Antioch, and Rome, were all, in turn, chosen as being the city. Maximinus, Maximiamus, or Galerius, was named as the reigning emperor.

The date of December 16, first chosen as the feast-day anniversary of her martyrdom, was later shifted to the 4th, upon which date it is now held.

Now if, as one version goes, she died in Nicomedia in 235 or 237 A. D., and was a disciple of Origen, then Maximinus, the gigantic Thracian (235-238 A. D.), is the emperor intended. While those versions that chose Heliopolis as the place, and 306 A. D. as the date, evidently mean either Maximianus (286 A. D.), or Maximinus Galerius Daza (308-313 A. D.), two of the numerous Co-Cæsars under Diocletian. But with such an evident romance, any questionings as to the exact date and exact emperor are surely idle.

This, then, is the tale:

Born the daughter of a wealthy heathen named Dioscorus, she grew to maidenhood so incomparably beautiful that her father shut her up in a high tower for safe-keeping. Guarded by her virtue even more than by her tower she studied deeply in philosophy until she grew to be as surpassing in learning and character as she was in loveliness. Suitors, rich and powerful, were all declined and her father was well content. But her studies and thoughts soon led her to see the folly of heathenism, and secretly she became a Christian.

Her father, departing on a long journey, gave orders as he left that a splendid bath-house should be built for her entertainment near her guarding tower. During the erection of this she overpersuaded the masons to disregard her father's strict orders and to place *three* windows therein, instead of the two he had planned. On his return he demanded an explanation, which she gave by

saying that the three windows were to remind her of the Triune God.

Upon her father thus discovering that she was a Christian, his inhuman rage knew no bounds. He beat and starved and shamefully abused her until, in despair, she fled into the surrounding desert, hiding herself there in a deep cavern, and being fed by two shepherds upon the milk of their flocks.

Furiously searching in her track came her brutal father. To his angry demand for his daughter one shepherd pleaded total ignorance. But the other, while vowing with his lips that he also knew nothing, yet slyly pointed with his thumb to the cavern where poor Barbara lay trembling, for which black treachery, in instant punishment, he and his whole flock were turned into stones that very moment.

The infuriated father haled Barbara off to the Governor of the Province, Marcian, or Martianus, and denounced her as one of the hated Christians. After cruel tortures, she was condemned to be beheaded, and her inhuman father himself acted as her executioner.

But chastisement for such monstrous conduct was not long delayed, for, on his way home from committing the foul deed, he was struck by lightning and wholly consumed. Ever since this exemplary vengeance Saint Barbara has been considered by the populace as their protectress against thunder, lightning and explosive flame of all kinds, becoming thus, by an easy analogy, when gunpowder appeared, the patron saint of cannoneers and ordnance men generally.

The cannoneers of Lille in France, who were commissioned under "Royal Letters Patent" in 1417 as the "Confrères de Sainte Barbe," were among the first to do this. Their example was speedily followed all through France, Italy, Germany and European countries generally, so that to this day, and in France especially, she is universally held to be the ordnance saint.

At Rome, libraries and orphanages were considered to be specially under her care; perhaps because they were peculiarly liable to disastrous fires; while on her feast-day, December 4, a solemn military mass was celebrated in her honor, in the Church of S. Maria Transpontine, after which cannon were fired in jubilation.

In art she is pictured standing by her three-windowed tower and holding in her hands the palm of her martyrdom, or sometimes a chalice and sacramental wafer, while cannon are displayed at her feet.

Descriptions of her cult, in modern times, were written by Celestin, "Histoire de S. Barbe" (Paris, 1853); Villemot, Histoire de S. Barbe, Vierge et Martyre" (Paris, 1865); and Peine, "St. Barbara die Schutz Heilige der Bergleute und der Artillerie, und ihre Darstellung in der Kunst" (Freiberg, 1896).

COMMANDER G. N. HOLLINS, U. S. N.

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THE NAVY AND FILIBUSTERING IN THE FIFTIES

(CONTINUED)

By LOUIS N. FEIPEL

III. THE BOMBARDMENT OF GREYTOWN, NICARAGUA, 1854

In 1855, the scene of American filibustering shifted to Central America, and in particular to the republic of Nicaragua. Events had been leading up to this ever since the year 1848. A few days after the conclusion of the treaty of Guadalupe Hidalgo, by which the United States became the rightful owners of California, and thus invested with augmented special interest in the political condition of Central America, the American Government learned that a military expedition, under the authority of the British Government, had landed at Greytown (or San Juan del Norte, as it was then called), in the state of Nicaragua, and taken forcible possession of that port, which was the necessary terminus of any canal or railway to be constructed across the isthmus within the territories of Nicaragua. It did not diminish the unwelcomeness to us of this act on the part of Great Britain to find that she assumed to justify it on the ground of an alleged protectorship of a small and obscure band of uncivilized Indians, whose proper name even had become lost to history, who did not constitute a state capable of territorial sovereignty, either in fact or of right, and all political interest in whom, and in the territory they occupied, Great Britain had previously renounced by successive treaties with Spain, when Spain was sovereign of the country, and subsequently with independent Spanish America.

Nevertheless, and injuriously affected as the United States conceived itself to be by this act of the British Government, and by its occupation about the same time of insular and of continental portions of the territory of Honduras, we remembered the many

and powerful ties and mutual interests by which Great Britain and the United States were associated, and we proceeded in earnest good faith, and with a sincere desire to do whatever might strengthen the bonds of peace between us, to negotiate with Great Britain a convention to assure the perfect neutrality of all inter-oceanic communications across the isthmus, and, as the indispensable condition of such neutrality, the absolute independence of the states of Central America and their complete sovereignty within the limits of their own territory, as well against Great Britain as against the United States. That object was supposed to have been accomplished by the convention of April 19, 1850 (the Clayton-Bulwer treaty), which would never have been signed or ratified on the part of the United States but for the conviction that, in virtue of its provisions, neither Great Britain nor the United States was thereafter to exercise any territorial sovereignty, in fact or in name, in any part of Central America, however or whensoever acquired, either before or afterwards. The essential object of the convention—the neutralization of the isthmus—would, of course, become a nullity if either Great Britain or the United States were to continue to hold exclusively islands or mainland of the isthmus, and more especially if, under any claim of protectorship of Indians, either government were to remain forever sovereign in fact of the Atlantic shores of the three states of Costa Rica, Nicaragua, and Honduras.

But in August, 1851, more than a year after the Clayton-Bulwer treaty had been perfected, a British vessel-of-war appeared in the fine and commanding harbor of Ruatan, an island belonging to the republic of Honduras. The captain of this vessel, an officer named Jolley, then proceeded to organize the island as a dependency of Belize (sometimes called British Honduras); and in July, 1852, a proclamation was made from Belize as follows:

OFFICE OF THE COLONIAL SECRETARY,
BELIZE, JULY 17, 1852.

This is to give notice that Her most Gracious Majesty our Queen has been pleased to constitute and make the islands of Ruatan, Bonacca, Utila, Barbarat, Helene, and Morat, to be a colony, to be known and designated as "The Colony of the Bay Islands."

By command of Her Majesty's Superintendent,
AUGUSTUS FRED. GORE, *Colonial Secretary.*

God save the Queen!

The British continued to hold possession of the Ruatan Islands up to 1856, and by the occasional presence of an English man-of-war at Greytown, continued their old pretensions to the Mosquito Coast. The threatened abrogation of the Clayton-Bulwer treaty restored matters to their old footing, except that the course of manifest destiny, during the intervening five years of drivelling diplomacy, ordained the occupation of the country by another race, in whom Great Britain found more energetic sticklers for the rights of their adopted soil than the dreamy and enfeebled creatures who for the preceding three centuries had claimed it as a home.

In March, 1852, Greytown was constituted a "free city," subject to the paramount authority of any power which might be decided to hold the government of the country to which Greytown belonged. All of its municipal regulations, port charges, and customs duties were determined by a mayor and council, who were, however, mere creatures of the British consul, the latter being virtually a dictator. The authorities of Greytown were formally acknowledged by the government of Great Britain, and Vice Admiral Sir George Seymour withdrew his ships from that station, as being no longer needed, thereby virtually confirming in the hands of, and ackowledging the ability of, the new government to maintain its laws. The people of Greytown looked with confidence for a similar recognition on the part of the United States.

At the time of which we are speaking, citizens of the United States had already established in the territory of Nicaragua a regular interoceanic transit route (the Accessory Transit Company), second in utility and value only to the one previously established in the territory of New Granada. By the year 1853, the Nicaragua route was doing a good business between New York and San Francisco. The trip between the two places was sometimes made in 19 days, which was shorter than by way of Panama. The steamer from New York went to Greytown, and there the passengers were put on board light-draft stern-wheel steamboats, which went up the San Juan River to Lake Nicaragua. There, at a village called Fort San Carlos, the passengers were transferred to commodious side-wheel steamboats, in which they crossed the lake to Virgin Bay, and from Virgin Bay they crossed in a conveyance of some kind to San Juan del Sur, a

distance of 10 miles, and then went on board the ocean steamer for San Francisco.

The condition of Nicaragua would doubtless have been much more prosperous at this time, but for the occupation of Greytown by Great Britain and the disturbing authority set up and sustained by that power in the Mosquito Coast, by means of which the domestic sovereignty of Nicaragua became impaired, its public lands withheld from settlement, and itself deprived of all the maritime revenue which it would otherwise have collected on important merchandise at Greytown. The United States Government had never recognized the sovereignty of a King of Mosquito, or the protectorate of Great Britain over Greytown. Daniel Webster, as Secretary of State, had, however, declared, in a letter to Commodore Foxhall A. Parker, dated March 13, 1852, that "a temporary recognition of the existing authority of the place (San Juan de Nicaragua, or Greytown), sufficient to countenance any well-intended endeavors on its part to preserve the public peace and punish wrong-doers, would not be inconsistent with the policy and honor of the United States"; and he accordingly directed the commodore, in the name of the President of the United States, "to repair to Greytown, and, in conjunction with Her Britannic Majesty's admiral on the West India Station, to see that all reasonable municipal and other regulations in force there were respected by the vessels and citizens of the United States resorting thither." Webster, also, learning that in an assemblage of persons styling themselves citizens of Greytown, held there on the 28th of February, 1852, resolutions had been passed to send a deputation to the capital of the republic of Nicaragua for the purpose of soliciting a charter for their city, requested, on the 18th of March following, Secretary of the Navy Graham to give to the American citizens, believed to have formed a majority of said assemblage, timely warning "that they would not be countenanced by his government in any attempt, forcibly or otherwise, to subvert the acting authorities." Subsequently, after the election of new municipal authorities at Greytown, in conformity with the constitution of March 29, 1852, and after the conclusion of the new treaty between the United States and Great Britain signed on the 30th of April of the same year, Lord Clarendon stated, in a despatch to the British minister at Washington, dated July 22, 1853, that both the British and American governments

had ordered their naval commanders to support the government *de facto* of Greytown; and Secretary of State Marcy, in a despatch to Mr. Ingersoll, the American minister at London, dated June 9, 1853, referring to said joint order, says that its purpose was to preserve the public peace at Greytown, and to punish wrong-doers.

The harbor of Greytown was formed by an island at the mouth of the San Juan River, and lying opposite to the town. On this island (called Punta Arenas) the Transit Company had its store-houses, and as long as the California passengers were detained occasionally and sent ashore to the town to pass a night or two, everything went smoothly. Finally, however, the company decided to build a hotel on the island, to keep the passengers on its side of the river during the transit, and to prevent their landing at Greytown at all—in short, to do all the "skinning" itself. This was more than the Greytowners could stand, and they accordingly declared war to the knife.[1]

On February 3, 1853, the "council" of Greytown passed a resolution ordering the Accessory Transit Company to remove within five days the buildings which it had just completed on Punta Arenas, and also to vacate the entire tract within 30 days. The company naturally ignored the demand; and the agent of the company, agreeable to instructions received from his principals in New York, proceeded to call on the British warship *Geyser* for protection. Captain Wilson, of the *Geyser,* however, informed the agent that he could render him no assistance. Getting wind of this state of affairs, the American sloop-of-war *Cyane,* Commander George N. Hollins, repaired to Greytown in order to keep the peace. The *Cyane* arrived on the 10th of February, and the agent of the company at once appealed to Commander Hollins for protection.

A portion of the property had already been destroyed, and the authorities of Greytown were proceeding to destroy the rest, when Hollins decided to dispatch his first lieutenant, Theodore P. Green, to the mayor of Greytown, with orders to state that information had been lodged with the American commander that on the succeeding day (February 11) a writ of ejectment would be served by the Greytown authorities upon the Transit Company, and in

[1] Parker, "Recollections of a Naval Officer," 165.

case of the company's refusal to remove the property, force would be used to compel them. Lieutenant Green found the council assembled, the mayor presiding, made the statement, and requested their answer. He was told to inform Commander Hollins that the process was a legal one, and that they would carry it into effect on the succeeding day, at 11 o'clock in the morning, unless prevented by a stronger force.

On the morning of the 11th, at 9 o'clock, Hollins went ashore to pay his respects to the mayor, and was received in the council chamber, the council being assembled. Hollins again informed them that in obedience to his orders he was compelled to put a stop to any depredations upon the property of the Transit Company. The mayor replied that "no depredations would be committed, they only intended to pull the building down." The mayor then requested a statement in writing of Hollins' intentions to prevent the execution of the process, which Hollins acceded to, and then withdrew to the ship.

Purser Charles C. Upham and Acting Lieutenant William H. Parker, of the *Cyane,* shortly afterwards returned from a visit to the town, bringing information that the troops were under arms and preparations making to proceed against Punta Arenas and its occupants, and that threats were being made to destroy the property by fire. Orders were accordingly given to land a marine guard on the Point, under the command of Lieutenant William Decatur Hurst, with instructions to inform the marshal that the property could not be molested, to warn off all suspected persons, and to prevent the execution of the threats. The marshal, upon being asked his business by Lieutenant Hurst, replied, "to tear down the buildings." Lieutenant Hurst then informed the marshal of his orders to protect the property of the company, and that he intended to obey and carry them out, whereupon the marshal immediately mustered his "posse of carpenters" and returned to Greytown.

From the many threats and the manifest excitement among the inhabitants of Greytown, Hollins deemed it necessary to continue the guard on Punta Arenas, about the property of the Transit Company, particularly at night. He also thought it proper to warn the citizens of Greytown of his intentions as to the persons and property of citizens of the United States who might be molested. One such instance had indeed already occurred. An American physician, named H. W. Wagner, was assaulted, on

March 14, in the most gross and indecent manner by three persons belonging to the militia of the town, who alleged, as an excuse, that Wagner had made false statements about the authorities having destroyed property belonging to another American citizen. Accordingly Hollins issued the following notice:

Inasmuch as no competent authority is in existence in the town of San Juan de Nicaragua to protect the property or persons of American or other citizens, and information having been lodged with me that an assault was committed upon the person of an American citizen by some person or persons in said town, I hereby warn all persons in said town that in case of any further molestation of any citizen or property, I shall take such steps as to bring the offender to punishment.

And further, that all boats to and from Point Arenas and San Juan de Nicaragua will pass within hail of the ship under my command.[2]

Hollins was soundly abused by the Greytowners for this, but he bore it philosophically, especially as the proclamation was heeded.[3]

Shortly afterwards, the *Geyser* again arrived off Greytown, under orders from Commodore McQuhae, who, it seems, had received a dispatch from the mayor of Greytown, informing him that Hollins had landed the marines of the *Cyane,* hauled down the Mosquito flag, taken charge of the town, and blockaded the harbor. Under this false impression the commodore had sent the commander of the *Geyser* to inquire into the facts of the case. It was plain that Commodore McQuhae had assumed to himself the right to district the limits of the city of Greytown. He included Punta Arenas within the jurisdiction of the city of Greytown, thus giving that city the right to execute any decree of their court, no matter how unjust to either persons or property. Hollins was fully convinced, from all that he saw and heard, that the whole cause of the hostility of Greytown towards the Transit Company proceeded from the company's refusing to move their depot and steamers to the city of Greytown, which would have been detrimental to their best interests.

In his official report to the Navy Department, Hollins justified his actions in the following terms:

On my arrival here, not having any authority by which I could be guided, I obeyed strictly the orders from the Navy Department to protect the property of the Accessory Transit Company, and also took for my guide the instructions of the late honorable Daniel Webster, which prescribes no

[2] Senate Exec. Doc. No. 8, 33d Cong., 1st Sess.

[3] Parker, "Recollections of a Naval Officer," 165.

special limits to this town, nor recognizes any jurisdiction of its court other than for its own police purposes, but at the same time gives to commanders of both American and English vessels of war full power to correct abuses and settle all difficulties.[4]

The Navy Department approved the prompt and prudent action of Hollins, and under date of April 4, 1853, instructed him to remain in the vicinity of Greytown as long as his presence might be deemed necessary to protect the property and persons of American citizens. The Secretary of the Navy added:

It is, of course, very important, in order to avoid collision, that your course should be marked with caution; but, at the same time, the impression should be distinctly made that the United States are both able and determined to protect the property and rights of American citizens. Of course, you will confine yourself to that one duty, carefully avoiding any act committing your government in any of the contested questions of jurisdiction at present disturbing that country.[5]

In giving its approval to Hollins' conduct, the Secretary of the Navy deemed it proper, also, to state to him the real grounds on which that approval was based.

Your conduct in affording protection, and saving from destruction the property of that company, is commended not because of any supposed stipulation for that purpose by convention between Great Britain and the United States, but because American citizens are largely and chiefly interested in said company, the charter of which was granted and guaranteed by the State of Nicaragua, within the limits of which state the town of San Juan is situated, and which charter was granted even long before any attempt was made to convert Greytown into what is now alleged to be an independent city. The authorities of Greytown have no right to interfere with rights and privileges thus granted by the State of Nicaragua. When they therefore attempted to destroy the property of the company, your interference is justified and approved solely because it is regarded as an unauthorized attempt to disturb the rights of American citizens, and the United States desire that the American citizen "shall realize that, upon every sea and on every soil where our enterprise may rightfully seek the protection of our flag, American citizenship is an inviolable panoply for the security of American rights."[6]

Meanwhile, however, on February 13, 1853, Commander Hollins received a visit from the British vice consul, Henry Grant Foot, who had just returned from Bluefields. He brought with him dispatches from Vice Admiral Seymour and Commodore McQuhae, of Her Britannic Majesty's naval forces in the West Indies, directed to Commodore Parker, with directions to place

[4] *Ibid.* [5] *Ibid.* [6] *Ibid.*

them in the hands of the senior American officer in command, in case Commodore Parker should be absent. These dispatches had reference to the concerting and concluding of such arrangements between Commodore Parker and Commodore McQuhae as should appear to both, conjointly, best suited to carry out the views of the British and American governments for the recognition of the *de facto* governing authorities of the port of Greytown, until some permanent arrangement should be concluded for the general and final settlement of the Mosquito and Central American question then pending between Great Britain, the United States, and certain of the Central American States.[7]

By the 16th of April, all was quiet again around Greytown. Hollins, however, soon heard rumors that the authorities of Greytown threatened the destruction of the Transit Company's property as soon as ever he left the harbor. Under these circumstances he did not deem it advisable to leave the place before being relieved, or before some positive arrangements could be made with the authorities, by which the property of the company would be respected. The English commanders in that region also received orders from their minister at Washington not to permit the property of the company to be molested, but at the same time their orders from the commodore of the station were for them not to remain in port over 48 hours, on account of preserving the health of their crews. The *Cyane* remained at Greytown for 70 days, "The dreariest time," as one of her officers subsequently wrote, "I ever passed in any foreign port, and that is saying a great deal. Our only excitement was caused by the arrival of the steamers from New York and New Orleans, which made fortnightly trips and brought us our mails, and the arrival of the steamers from Lake Nicaragua with the San Francisco passengers."[8]

On May 30, 1853, the sloop-of-war *Albany*, Commander James T. Gerry, arrived at Greytown. The authorities of the place, as well as the agents of the Transit Company, immediately called on Commander Gerry, who soon perceived from their accounts that a mediator was required to bring the two parties to a mutual

[7] *Ibid.*

[8] Parker, "Recollections of a Naval Officer," 165. The documents bearing upon these transactions between Hollins and the authorities of Greytown were called for by the Senate on the 6th of April, 1853, and printed as Senate Executive Document No. 8, of the 33d Congress, 1st Session.

friendly intercourse and a better understanding of each other's rights and views of subjects in dispute. Commander Gerry expressed his readiness to intercede and bring about a better feeling, provided each party should state to him all its grievances, and provided they consented to be influenced by his advice and opinion. The sequel showed that both parties had acted under strongly excited feelings, and that the one was quite as much at fault as the other. But in Commander Gerry's opinion, the inhabitants of Greytown were certainly entitled to more consideration than the Transit Company had extended to them, inasmuch as many of them had, at the company's invitation and through inducements held out to them, made large investments for accommodating the passengers of the company when the latter was unable to do so and depended solely upon the conveniences to be found in Greytown. The results of Gerry's investigations were attended with the most favorable consequences. On the 5th of June, he sailed from Greytown, leaving all parties apparently friends and determined to settle every point of controversy between them in future by arbitration, and not by violence.

Shortly after the arrival of Gerry at Greytown, also, the mayor informed him that if he wanted a marine who had deserted from the *Cyane* to be apprehended, he (the mayor) would order him in custody of an officer on board the *Albany* the following morning, which was promptly complied with as set forth.[*]

About a year later, events again occurred by reason of which the government of the United States considered itself justified in treating Greytown as a hostile city. In March, 1854, new differences arose between the people of Greytown and the Transit Company over the question of jurisdiction in Punta Arenas. Mr. Joseph L. White, agent of the company, left the place on the 17th of March, without having effected any settlement of the difficulties. Before leaving, he gave instructions to the captains and pursers of the steamships to pay no more port charges at Greytown, and to take no letters or other packages or freight for, and have no communication of any nature whatever with, the people of the town. This proceeding on the part of the company greatly exasperated the townspeople. Also, during the month of May, certain effects belonging to the company were feloniously taken

[*] House Exec. Doc. No. 86, 33d Cong., 1st Sess., p. 230.

away by a servant of the company and conveyed to Greytown, where they were withheld from the company by the corporate authorities. And at the same time, and in connection with this occurrence, two of the employees of the company were arrested on warrants emanating from the town authorities, charged with having resisted a legal process and committing an assault, and were placed under bonds to keep the peace towards the authorities and citizens of Greytown.

Moreover, about the middle of May, the United States minister to Central America, Mr. Solon Borland, was about to leave Nicaragua, and took passage on board the *Routh*, one of the San Juan River steamers. Nothing particular occurred during the passage down the river, until the steamer was within a few miles of Greytown. There Captain T. T. Smith, who was in command of the *Routh*, in turning a bend of the river, ran against a bungo freighted with merchandise which was lying near the shore, and damaged her by the collision. The master of the bungo began to abuse Captain Smith in Spanish, to which the latter retorted fully in English. While the steamer was being extricated from the brushwood, Captain Smith went and got his rifle from the cabin, vociferating repeatedly, "I must shoot the fellow; he has used threatening language that shall cost him his life." Shortly afterwards the master of the bungo was shot down by Captain Smith from the upper deck of the steamer, and the latter then proceeded on her way down the river.

Mr. Borland had witnessed, if not the beginning, at least the greater part of this shooting, from the upper deck, but apparently made no interference. Another passenger, however, a Mr. H. Wiedemann, tried to persuade Captain Smith not to carry out his design. Wiedemann even went so far as twice to prevent Smith from firing. The third time, Smith exclaimed, "I am captain of this boat, and I will not permit even my best friend to interfere." After having committed the deed, he made the following remark to Wiedemann: "I am sorry for this, but I could not help it."

On the evening of the 16th, the *Routh* arrived at Punta Arenas and went alongside the steamer *Northern Light* to disembark her passengers. About dusk, while the passengers were going from one steamer to the other, a bungo, having on board some 25 or 30 armed men, mostly Jamaica negroes, headed by a mulatto man calling himself the "marshal," came over from Greytown

and ranged up alongside the *Routh*. The so-called marshal, accompanied by several of his armed men, jumped on board the steamer, and announced his purpose of arresting Captain Smith, by virtue of a warrant from the mayor of Greytown, on the charge of murder. Captain Smith, however, refused to be arrested and armed himself for resistance.

At this stage of the proceedings, Minister Borland, who was at the time on board the *Northern Light*, was informed of what was going on. He immediately went on board the *Routh*, where he found a crowd of persons, among them a number of the armed men from the bungo, in a high state of excitement. The marshal, with his men, was attempting to arrest Captain Smith; and the latter, standing at the cabin door, was keeping them at bay. Mr. Borland at once interposed, telling the marshal that no authority recognized by the United States existed at Greytown to arrest or in any way to interfere with an American citizen, and ordered him to withdraw his men from the steamer and go away. The marshal proposed to exhibit the mayor's warrant under which he was acting, but this Mr. Borland declined to examine.

After some hesitation, the marshal announced his purpose of withdrawing, as advised by Mr. Borland. But while this was going on, and before the marshal and his men had left the steamer, much excitement was manifested among the men who had remained on board the bungo. Loud, threatening language was used by them, and, brandishing their weapons, several at once rushed on board the steamer. At this moment, Mr. Borland, taking a rifle from the hands of a bystander, stepped over the railing upon the guards, and warned the men in the bungo to keep off, and at their peril not to put a foot on the steamer. Upon this, the movement towards boarding the steamer ceased, and in a few minutes the marshal and his men returned to the bungo, and she returned to Greytown.

About dark, Mr. Borland, accompanied by Mr. Scott, a son of the agent of the Transit Company, boarded one of the boats of the *Northern Light* and went across the harbor to Greytown, in order to visit Mr. Fabens, our commercial agent. Soon after arriving there, Mr. Borland heard that at a meeting of the people of the town, held at the station-house, and presided over by the mayor, it had been proposed, and seemingly agreed to, that he (Mr. Borland) should be arrested. In a few minutes the execu-

tion of this act was attempted. A loud knocking was heard at the lower doors of Mr. Fabens' house, and upon his going to ascertain the cause, a body of men, armed with muskets, consisting in part of the regular police of the town, and headed by a Jamaica negro, inquired for Mr. Borland, and declared their purpose of arresting him.

Mr. Borland, hearing this, went down-stairs, and demanded their business with him. The leader informed him that they had come by order of the mayor to arrest him because he had prevented the arrest of Captain Smith. Mr. Borland then repeated to them what he had said to the marshal about their want of authority, and inquired of them if they were not aware of his exemption from arrest in his capacity of minister of the United States. To this they replied that they cared nothing for all that, but that they had come to arrest him, and meant to do it. He then warned them of the serious consequences to themselves and to all concerned with them, if they proceeded to the extremities they proposed. They replied that they knew the consequences and were prepared to meet them. Mr. Borland then declared that they must proceed at their peril, and called several gentlemen, who were in an upper room, to come down and be witness of the threatened assault upon him. Thereupon the leader of the armed force called a Mr. Martin, who was ex-mayor, as if for the purpose of consultation, and Martin not answering, they went off a little from the door, in the direction where, from their manner, they expected to find him.

About this time, Mr. Borland still standing at the door, the mayor (a Frenchman) came up and said that these proceedings had been without his order and authority. To his proposition whether the minister would be satisfied with an address signed by all the respectable inhabitants of the place, expressing their indignation at the insult, Mr. Borland replied: "It is not I who have been insulted, but the government of the United States in my person." This naturally cut off all further endeavors on the part of the inhabitants to redress the matter. While this conversation was going on, some one from the crowd threw a broken bottle which struck Mr. Borland and slightly wounded him in the face. The particular person who threw the missile was not recognized, as the night was dark and there was a crowd on the porch about the door. Soon after this, the crowd dispersed.

Mr. Fabens, the commercial agent, then procured a canoe and crossed the harbor to the *Northern Light,* to make known the state of affairs on the other side. A meeting was held, at which it was agreed to send a committee of three gentlemen to consult with Mr. Boland as to the best steps to be taken. These gentlemen, with Mr. Fabens, proceeded in one of the steamer's boats to the town; but upon approaching the shore, they were hailed by a number of armed men, who fired one gun over the boat, and threatened to fire into them it they attempted to land, and this although informed that Mr. Fabens was on board and desired to go to his consulate. Thus forcibly prevented from landing, the boat returned to the *Northern Light.* During the night, Greytown was occupied by armed men, whose sentinels were stationed between the American consulate (where Mr. Borland still was) and the harbor, challenging all who attempted to pass, preventing boats from landing or leaving, and thus keeping Mr. Borland a prisoner all night.

The next morning, Mr. Borland procured a boat and returned on board the *Northern Light,* where he was informed by Mr. Fabens of the violent and lawless disposition manifested by the people of Greytown. The persons and property of our citizens were not deemed safe from aggression, or from destruction, in the absence of force sufficient to protect them. A meeting of the passengers was accordingly held, at which Mr. Borland proposed to engage the services of 50 men to remain and afford the necessary protection, until our government, informed of the state of affairs, should send a proper force for the purpose. The requisite number of men volunteered, and were organized under the command of Crawford Fletcher. Mr. Fabens took up his abode under their protection, while Mr. Borland embarked in the *Northern Light* to proceed forthwith to Washington and lay the matter before the government.

The *Northern Light* sailed on the evening of the 17th. The next morning the British war-steamer *Argus* arrived. The people of Greytown at once applied to her commander for an order to disperse the force of Americans at Punta Arenas, which he declined giving. The *Argus* remained four days in port, and sailed for Port Royal, Jamaica. On the morning of the arrival of the *Argus,* all the authorities of Greytown resigned their offices. The station-house, with the arms and ammunition belonging to

the town, continued in the possession of the Jamaica negroes, the same who had committed the outrage related above.

With respect to the existing controversy between the authorities of Greytown and the Transit Company, it was alleged by the residents of Greytown that the agents of the company wished to overthrow the authorities for two reasons: first, to relieve the company from port charges; and, secondly, to secure to certain employees of the company possession and title to lands within the jurisdiction of Greytown, acquired under an imperfect title. In order to carry out their object, it was alleged that the President of the United States was informed that it was due to the protection of American property there located, and in transit across the territory occupied by them, that Greytown should be destroyed and the inhabitants thereof dispersed. Accordingly, the President sent the sloop-of-war *Cyane* to the harbor of Greytown, with instructions to demand that immediate indemnity in a large amount should be made to the Transit Company, with prompt apology for the insult offered the United States minister, and satisfactory assurance for the future good behavior of the community.[20]

On June 10, the *Cyane,* which was then in New York, was ordered to proceed to Greytown. The orders to Commander Hollins included the following admonition:

> It is very desirable that these people should be taught that the United States will not tolerate these outrages, and that they have the power and the determination to check them. It is, however, very much to be hoped that you can effect the purposes of your visit without a resort to violence and destruction of property and loss of life. The presence of your vessel will, no doubt, work much good. The department reposes much in your prudence and good sense.

Meanwhile, on June 24, our consul, Mr. Fabens, notified the late "acting authorities and the people of the town" that the United States Government would require of them reparation for the wrongs they had committed against our citizens. He received no official reply, the town being, as has been said, without political organization. But the information which reached Fabens through private sources was to the effect that the people of the town were fully determined to make no pecuniary redress, either to the Transit Company or to the government of the United States, for

[20] House Rept. No. 281, 36th Cong., 1st Sess.

any obnoxious acts they might have committed. In the matter of the personal assault upon Mr. Borland, they were especially insulting in their remarks, and regretted, to use their own language, that they had not kept him a prisoner at Greytown and made him answerable for the act alleged to have been committed by Captain Smith.

The *Cyane* arrived at Greytown on July 11. After conferring on the situation, it was decided by Mr. Fabens and Commander Hollins that it would be expedient to renew the demand already made for reparation, and in such a manner as to impress the people of the town with the idea that satisfaction for their past injuries and insults towards American citizens must and would be had. Thereupon Fabens proceeded at once to Punta Arenas, to agree with Mr. Scott, agent of the Transit Company, as to the sum of money proper to be demanded for the losses and damages suffered by the company. Mr. Scott placed the sum at six thousand dollars. This amount being fully approved by Commander Hollins, on the same evening the demand was made, as follows:

COMMERCIAL AGENCY, UNITED STATES OF AMERICA,
SAN JUAN DEL NORTE, NICARAGUA, July 11, 1854.

To those now or lately pretending to and exercising authority in, and to the people of, San Juan del Norte:

GENTLEMEN: On the 24th ultimo, in accordance with the instructions of the government of the United States of America, I notified you that the said government would require of you immediate reparation for the property belonging to the Accessory Transit Company, which was stolen from the said company and received by you, as specified in my letter of that date, as well as for all damages suffered by their agents and employés while endeavoring to repossess themselves of the same. I have now, acting in concert with Commander Hollins, of the United States ship *Cyane*, at present in this harbor, to demand of you immediate payment of the sum of sixteen thousand dollars, which has been adjudged to be the proper sum for you to pay for the said property and the gross outrages perpetrated by you upon the persons of American citizens, as set forth in protests of Mr. Scott of the 12th May last, copies of which have already been served upon you.

There is likewise a claim of the Accessory Transit Company versus the acting authorities of San Juan del Norte for the sum of eight thousand dollars, as specified in my letter to you of the 24th ultimo. This you will be likewise expected to pay forthwith.

For the indignity offered to the United States of America in the conduct of the authorities and people of this town towards their minister, Mr. Bor-

land, while recently in this place, nothing short of an apology, promptly made, and satisfactory assurances given to Commander Hollins of future good behavior on the part of said authorities and people towards the United States and her public functionaries, who may in future be here, will save the place from the infliction which its late acts justly merit.

Your obedient servant,

JOSEPH W. FABENS,

United States Commercial Agent.

To this demand, the same reply, substantially, was given as to the previous one, only it was couched in more insolent language. But the presence in the harbor, at the time, of the British war-schooner *Bermuda* may have had some influence on the conduct of the people of Greytown on this occasion.

On the 12th of July, Hollins decided to give the offenders 24 hours' further notice to render satisfaction, and if this was not offered at the expiration of that time, to bombard the town. He accordingly, on the morning of that day, issued the following proclamation:

PROCLAMATION

To all men to whom these presents shall come, or to whom they may concern, greeting:

Know ye, that whereas certain gross outrages have, at sundry times, been perpetrated by the "authorities" (so called) and people of San Juan del Norte upon the persons and property of American citizens at that place and vicinity, and whereas a serious insult and indignity has been offered to the United States in the conduct of the said authorities and people towards Mr. Borland, United States minister to Central America, for which outrage and insult no indemnity has been given, and no satisfactory reply returned to demands already made:

Now, therefore, I, George N. Hollins, commander of the United States ship of war *Cyane*, by virtue of my instructions from the United States Government at Washington, do hereby solemnly proclaim and declare, that if the demands for satisfaction in the matters above-named, specified in the letter of Mr. Fabens, United States commercial agent, dated 11th instant, are not forthwith complied with, I shall, at 9 o'clock a. m., of to-morrow, 13th instant, proceed to bombard the town of San Juan del Norte aforesaid, to the end that the rights of our country and citizens may be vindicated, and as a guarantee for future protection.

GEORGE N. HOLLINS, *Commander.*

U. S. SHIP "CYANE,"

HARBOR OF SAN JUAN DEL NORTE, NICARAGUA, 9 a. m., July 12, 1854.

Copies of this proclamation Fabens caused to be posted in the three most conspicuous parts of the town, where they were

universally read. The British man-of-war *Bermuda* was still lying in the harbor, right between the *Cyane* and the shore. The British captain, W. D. Jolley, refused to move out of range until the guns of the *Cyane* had been trained so as to rake his decks, when he reluctantly dropped astern. At the same time, he entered a protest against this course of conduct on the part of the American commander. He wrote to Hollins as follows:

> The inhabitants of this city, as well as the houses and property, are entirely defenceless and quite at your mercy. I do therefore notify you that such an act will be without precedent among civilized nations; and I beg to call your attention to the fact that a large amount of property of British subjects, as well as others, which it is my duty to protect, will be destroyed; but the force under my command is so totally inadequate for this protection against the *Cyane*, I can only enter this my protest.

To which Commander Hollins at once replied:

> The people of San Juan del Norte have seen fit to commit outrages upon the property and persons of citizens of the United States after a manner only to be regarded as piratical, and I am directed to enforce that reparation demanded by my government. Be assured I sympathize with yourself in the risk of English subjects and property under the circumstances, and regret exceedingly the force under your command is not doubly equal to that of the *Cyane*.[11]

This disparity in force, as one chronicler has it, "is to be regretted, in view of the wearisome and vain diplomacy afterwards spent upon a question which force alone, or the show of it, could finally settle."[12]

On the morning of the 12th, as an earnest of his intentions as set forth in the proclamation, Commander Hollins dispatched a guard of marines and seamen, under the command of Lieutenants Pickering and Fauntleroy, to secure the arms and ammunition in the town, as an evident disposition was manifest among the people to make an improper use of them; and also to assist and protect Mr. Fabens and others in the removal of their property. This duty was quickly performed, and the arms and other things deposited on Punta Arenas, in charge of the agent of the Transit Company, to await further disposition. At the same time, foreigners generally, and those favorable to the United States, were notified that a steamer would be in readiness on the morning of

[11] Senate Exec. Doc. No. 85, and House Exec. Doc. No. 126, 33d Cong., 1st Sess.

[12] Roche, "Story of the Filibusters," 68.

the day of the bombardment, to convey such as were disposed to a place of safety.

Agreeable to promise, a steamer was sent to the town at daylight on the morning of the 13th. Only a few of the inhabitants accepted the proffered assistance, and were conveyed to Punta Arenas. The majority of the inhabitants either from fright or from a wish to set at defiance the threats made against the town, had left, or were willing to remain and risk the consequences. Hollins had hoped that the show of determination on the part of his ship would, at this stage of the proceedings, have brought about a satisfactory adjustment of the differences; but this total disregard for and contempt toward the government of the United States determined him to execute his threats to the letter.

At 9 o'clock, on the morning of the 13th of July, the *Cyane's* batteries were opened on the town with shot and shell for three-quarters of an hour, followed by an intermission of equal duration, after which the batteries were opened again for half an hour, followed by a second intermission of three hours. At the expiration of this time, the firing was recommenced and continued for 20 minutes, when the bombardment ceased. The object of these several intervals in the bombardment was, that an opportunity to treat and satisfactorily arrange matters might be furnished the inhabitants of the town. No advantage was taken of this consideration, and at 4 p. m., a command, under Lieutenants Pickering and Fauntleroy, was sent on shore with orders to complete the destruction of the town by fire. The property of Mr. De Barwell, a Frenchman, was directed to be exempted from destruction, if possible, as Hollins had learned that he had protested against, and had held himself aloof from, any co-operation with the townspeople or pretended authorities of Greytown. The town was thus destroyed, for the greater part, in the short space of two hours. No lives were lost, although an attack was made by an armed party on the command of Lieutenants Pickering and Fauntleroy; but on the volley being returned, the attacking party fled. The shots were returned more for the purpose of frightening than to destroy life, and had the desired effect.

The execution done by shot and shell amounted almost to the total destruction of the buildings. But it was thought best to make the punishment of such a character as to inculcate a lesson never to be forgotten by those who had for so long a time set

at defiance all warnings, as well as to satisfy the whole world that the United States had the power and determination to enforce that reparation and respect due them as a government, in whatever quarter the outrage might be committed. The property destroyed was valued by the inhabitants at $1,200,000.[13]

The Royal Mail-Packet *Dee* arrived in the harbor during the conflagration, but left immediately, taking in tow the *Bermuda*, thus leaving the English subjects referred to in Lieutenant Jolley's communication without any assistance. No communication from Lieutenant Jolley was made with the *Cyane* prior to his departure. But Hollins learned that Jolley carried with him a number of the principal participators in the outrages that had been committed by the town of San Juan, and among them was the former mayor, Mr. Martin. On the 14th, Mr. Fabens and his effects were removed to the *Cyane* for safe-keeping, and shortly afterwards the vessel departed for Boston.[14]

At the time these events took place, Greytown numbered about 300 inhabitants, of all sorts, consisting of a few Englishmen, Frenchmen, Germans, and men from the United States, but mainly of negroes from Jamaica and some natives of the Mosquito Shore. There were also two or three natives from the interior of Nicaragua. The Jamaica negroes constituted the majority, and exercised the greatest influence. At the last election and corporate organization, no American (except one mulatto man from New Orleans) was included. Of these people, some 75 to 100 could be mustered for military service, and they had in their possession three brass cannons—one 18-pounder and two 12-pounders—and about 200 muskets. With the exception of a few persons, these people owned no property, and had no ostensible means of livelihood. In their anomalous condition, without a government which any civilized nation could recognize, and occupying, indeed, by usurpation, territory which our government recognized as belonging to Nicaragua, and being, moreover, persons almost without exception of notoriously bad character, some of them discharged penitentiary convicts and refugees from justice, habitually manifesting evil dispositions towards our citizens, and indulging those dispositions to the injury of persons and property whenever they

[13] House Rept. No. 281, 36th Cong., 1st Sess.

[14] Senate Exec. Doc. No. 85, and House Exec. Doc. No. 126, 33d Cong., 1st Sess.

were not restrained by force, they could hardly be regarded in any other light than as pirates and outlaws, upon whom punishment to the extent of extermination might rightfully be inflicted by any hand that had the power.[15]

In Mr. Borland's opinion, at least, the interests of good government and humanity imposed the duty on any offended party of inflicting such punishment in a manner at once summary and effective.[16] "But it was a pitiable spectacle," says one historian, "to see a great republic wasting its powder on the miserable huts of these outlaws, while the real offenders against its dignity sat quietly by under the protecting folds of the Union Jack. The guns of the *Cyane* might with more justice have been turned upon the instigators of all the trouble."[17]

The foregoing is believed to be the only full and connected account of the bombardment and destruction of Greytown by the naval forces of the United States. Even Commander Parker, who served on board the *Cyane* at the time, and who published his "Recollections of a Naval Officer" in 1883, disposes of the episode in about four lines. He writes: "The *Cyane* returned to Greytown in 1854 and bombarded it. I have really forgotten on what grounds Captain Hollins did this; but it was a nest of pirates, and the pity is he did not destroy the inhabitants and spare the houses."[18]

[15] W. H. Parker, who was an acting lieutenant on board the *Cyane*, says: "The town at the time of our visit in the spring of 1853 was inhabited by a lawless set of desperadoes, of all nations, who had organized some kind of a city government. The mayor was said to have been an escaped convict from Sing Sing, and I believe it was so, for the others were evidently tarred with the same brush. They resembled the old buccaneers in everything save courage. These people made a living by preying upon the passengers passing to and from California, of whom large numbers were detained at Greytown a day or two at a time on their passage—more by design than by accident. Nearly every house was a hotel."—Parker, "Recollections of a Naval Officer," 164-5.

[16] Senate Exec. Doc. No. 85, and House Exec. Doc. No. 126, 33d Cong., 1st Sess.

[17] Scroggs, "Filibusters and Financiers," 77-78.

[18] Parker, "Recollections," 170. On July 31, 1854, in compliance with a joint resolution of both Houses of Congress, dated July 28, President Pierce transmitted the official documents in regard to the destruction of Greytown. These documents were printed as Senate Executive Document No. 85, and also as House Executive Document No. 126, of the 33d Congress, 1st Session.

Through the British, French, and German ministers at Washington, the citizens of Great Britain, France, and the Hanse Towns who sustained losses in the bombardment of Greytown tried to secure indemnity from the United States, but without success.[19] It remained, however, for certain citizens of the United States, some years later (in 1860), to petition Congress successfully with regard to the injuries suffered by them through the bombardment. These memorialists alleged that the criminal charges made against the community of Greytown were untrue, and had been fabricated by its enemies for the purpose of deceiving and misleading the United States Government; and they charged that the entire course of the naval and civil representatives of the United States then at Greytown was irregular and unwarrantable, and that they were entitled to indemnity for the losses sustained in consequence of said destruction of their property. The House Committee on Foreign Affairs, regarding it as the duty of a powerful nation to do exact justice to a feeble and unprotected people complaining of injury at its hands, and especially to examine whether citizens of the United States had been injured by their own government acting upon false or insufficient information, recommended the adoption of resolutions for their relief.[20]

[19] See Senate Exec. Docs. Nos. 9 and 10, 35th Cong., 1st Sess.

[20] See House Rept. No. 281, 36th Cong., 1st Sess.

[TO BE CONTINUED]

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

LETTERS ON NAVAL STRATEGY

BASED ON THE NAVAL CAMPAIGN OF 1805

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FIRST LETTER

1. INTRODUCTION

The German military writer Prince Kraft zu Hohenlohe-Ingelfingen in his well-known work "Letters on Strategy" describes several military campaigns from the point of view of the commanding generals. By careful and impartial criticism he shows how leaders have in some cases correctly applied the principles upon which the art of strategy is based. In other cases, where leaders have failed to apply correctly these principles, he shows the causes which have been responsible for their failure. Prince Hohenlohe gives us in this way an excellent exposition of the principles of military strategy and the various ways in which they should be applied in land warfare. As yet no one has covered the field of naval strategy in this way. It will be my object to do this.

While there are a great number of campaigns on land which could be used to illustrate the art of military strategy, there have been comparatively few on the sea which can be used for a study of naval strategy.

You must admit that the greatest naval campaign in history from the strategical point of view was that of 1805 between Napoleon and England. This campaign had the whole Atlantic Ocean for its stage, and it might well have spread into the Indian Ocean too had Napoleon wished it. More great leaders played parts in this campaign than in any other on the sea: on the French side was the master, Napoleon; on the English side were Pitt, Barham and Nelson. In addition, and this is most important for our purpose, it has been more carefully studied than any other campaign, and in recent years not only the facts, but even the detailed plans of the opposing leaders have been set forth by careful historians.

Julian Corbett, the well-known English writer, describes the campaign from the English point of view in his detailed work "The Campaign of Trafalgar." We may presume that the facts concerning the English forces, as he gives them, are accurate. However, his hatred of Napoleon is so apparent that his opinions regarding the French forces must be carefully considered before they are accepted. Colonel Desbrière of the French Army in his work "La Campaigne Maritime de 1805" covers the ground very thoroughly from the French point of view. Details may occasionally be supplied from Mahan, Jurien de la Gravière and James, while the Naval Chronicles give some valuable information as to the disposition of the English forces. The "Barham Papers" and "Blockade of Brest" give the English orders issued.

Having gained the facts from these authorities, I will proceed in my own way to deduce the conclusions from them. We will endeavor to see the various general principles of the art of naval strategy and the ways in which they were applied by the leaders in this campaign. In carrying out this program, it will not be my object to criticize the leaders for what might be considered mistakes. Such criticism is never profitable. In order to make a careful and impartial criticism, one must put himself in the place of the leader whose work he is examining, one must look at the situation from his point of view and with the information he had at the time. Also, one must take into consideration the fact that one can arrive at a correct decision more easily when he has no responsibility in the matter, than when the fate of a nation depends upon his actions. It is always easy for the looker-on at a game of chess or cards to see glaring mistakes on the part of the player. How much more so is this true of war, where the critic is out of danger and has no responsibility, while the admiral's decision may determine the course of the whole war! Napoleon once said that "people formed a very incorrect idea of the strength necessary to wage, with a full knowledge of its consequences, one of those great battles upon which depended the fate of an army and a country." If, therefore, we should see that such men as Napoleon, Barham and Nelson made what we, with our imperfect knowledge, might call mistakes, it should only prove to us how difficult it is to avoid them. If we expect to see a certain number of mistakes on the part of even these great leaders, we will be merely wasting time if we indulge in criticism of the

lesser leaders. I believe that none of you would wish to have me repeat the criticisms which have been leveled at the poor scapegoat Villeneuve for over a century, and the violent attacks which every English historian has made upon Napoleon's conduct in this campaign. Therefore, when it would appear that mistakes have been made, we will not criticize the leader who apparently made them, but will try to discover the causes for these mistakes, so that if any one of us is ever in a similar situation, he may have a hint as to how to avoid repeating them.

2. THE POLITICAL OBJECTS OF NAPOLEON AND ENGLAND

Strategy is so closely connected with policy, that we must begin our examination of the campaign with a rapid glance over the political situation. At the beginning of 1805, England was arrayed against a combination of France, Spain and Holland, at whose head was Napoleon. Naturally, the ultimate political object of each nation was the complete overthrow of the other. However, the attitude of the other European nations gave each an immediate object, as it might be called. The English saw that, although they might maintain a successful defence without the assistance of other nations, any real offensive against France was impossible without the assistance of continental nations. Therefore William Pitt, the very able Prime Minister, was trying to engineer a great coalition of continental nations against France. This great combination was to include Russia, Austria, Prussia, Sweden, Naples and Portugal. Pitt was assisted in his work by the alarm of these nations caused by Napoleon's aggressive policy, but was hindered by their fear of France and Napoleon. Each of the continental nations would have been glad to overthrow Napoleon, but as Napoleon was known to be treating with all of them, and offering them bribes for their services, each one distrusted the others and feared to take the initiative and declare openly against France, lest by the treachery or delay of the others, it would be left exposed singly to the might of France and the genius of Napoleon.

Thus England's great object was to organize this great coalition against Napoleon. Napoleon's object was naturally to strike down England before the continental nations could come to her assistance.

3. THE MILITARY MEANS OF GAINING THESE POLITICAL OBJECTS

You will say that it was naturally the task of policy and not that of strategy to organize the coalition. But you must admit that it was in this case too big a job for policy to handle. It would be rather a difficult job for the diplomat to induce any nation to declare against Napoleon at that time because, no matter what arrangements would be made with other nations to cooperate, this first nation was almost certain to have to stand alone against Napoleon on the land for some time, while the other nations looked on and saw the direction in which the events were marching before they lived up to their agreements. It is true that this first nation would have the assistance of England, but this, despite the great naval victories, had not thus far been of great advantage to the continental nations. These nations recognized the fact that England could, with her superior sea power, maintain a war for years without serious risk, but that they could not enter the war without running the risk of immediate and complete overthrow by the French Army. Therefore, to induce the continental nations to join the coalition it was necessary for England:

1st. To prove to the continental nations that she could assist them in the land warfare; and,

2d. To prove that she was confident as to the result of this land warfare, by taking such a position that she could not escape a great loss should this warfare result unfavorably.

The only way for England to do this was to send her entire army of regular troops to the continent. This would show that England could be of considerable actual assistance on the continent and would show that she was really in earnest. Thus the only effective military means by which England could gain her immediate political object was to cooperate on the continent with the armies of Austria, Russia and Prussia.

Napoleon had three military methods by which he might strike down England:

1st. An invasion in force of England.

2d. Operations against the English commerce.

3d. Operations against the English colonies.

Now we must see what forces Napoleon had available for the execution of these plans of operations. First let us examine the

strength of his naval forces, as these were naturally, from the character of the war, the most important. As the ships of the line composed the real battle force it is with them that we will be principally concerned. Ships of the line can be divided into three general classes:

1st. Three-deckers of from 120 to 98 guns.

2d. Two-deckers of from 80 to 64 guns.

3d. Fifty-gun ships.

If we take the two-decker as unity, we may count the three-decker as equal to two units. Corbett discusses this matter very fully and you may refer to him for the reasons which led him to this conclusion. While I believe the following proposal to be original, I think we might consider, without great inaccuracy, the 50-gun ship to be equivalent to one-half a unit. Thus in determining the strength of any squadron we will in our discussion consider:

1st. A three-decker as two units.

2d. A two-decker as one unit.

3d. A 50-gun ship as one-half a unit.

In addition to the ships of the line there were frigates, having from 44 to 32 guns, and corvettes, brigs, sloops and cutters. These classes of ships rarely took part in actions between ships of the line, and were used for scouting, carrying information, escorting convoys, and cruising singly to defend commerce and attack the enemy's commerce.

At the beginning of January Napoleon's forces were disposed as follows:

At the Texel, Holland: Six Dutch two-deckers..... 6 units.
At Brest, France: Three three-deckers, 18 two-deckers, all French..24 units.
At Rochefort, France: One three-decker, four two-deckers, all French ..... 6 units.
At Ferrol, Spain: Five French two-deckers..... 5 units.
At Cadiz, Spain: One French two-decker, *Aigle*..... 1 unit.
At Toulon, France: Eleven French two-deckers.....11 units.

This makes a total ready for sea in home waters of.....53 units.

In addition, there were in the East Indies one French two-decker, *Marengo,* and four Dutch two-deckers, five units in all; but the Dutch ships were in very poor condition and it is doubtful whether they were fit for active service. The Spanish Government had promised that by the end of March there would be at least 30 Spanish units ready for sea and available for Napoleon's use.

The principal land forces available for use against England were disposed as follows:

At the Texel, 25,000 men with transports, under the command of Marshal Marmont.

Near Boulogne, over 90,000, with a flotilla of over 1500 boats capable of carrying them to England, under the personal command of the Emperor.

4. THE DISPOSITIONS OF THE ENGLISH NAVAL FORCES

As the English Army was not ready on the 1st of January and would require at least three or four months' preparation before it could attempt operations on the continent, the English were reduced for the present to the strategical defensive. As Napoleon had several lines of attack, the English Navy had to be so disposed as to:

1st. Guard England itself from invasion;

2d. Protect as many as possible of the colonies; and,

3d. Protect as much as possible the oversea commerce.

Of these threats the most important was that of the invasion of England, and before anything else could be done, it was evident that an effective defence against this attack must be provided. As a means of local defence, a line of six old ships of the line were moored permanently along the English coast in the area through which the French flotilla must pass. On these were based a large number of small craft, which were backed up by a number of frigates. This local defence made it necessary for Napoleon to mass in the Straits a force strong enough to break it down. This French force naturally could not force its way into the Channel and maintain its position there for several days unless it were in turn supported by a battle fleet strong enough to drive clear the British battle squadrons. Thus Napoleon, if he desired to carry out the invasion project, must mass in the Channel a battle fleet so strong as to be able to maintain the control of the Channel for a number of days. Therefore you will say that the simplest way for the English to parry this most important attack would be to mass all their forces in the Channel, just as an army in a land campaign masses all its forces at the most important point. But while this would undoubtedly frustrate the Emperor's plan of invasion, it would give him a free hand to attack the English

commerce and colonies. The first strategic decision for the British Admiralty to make was whether it had a naval force sufficient:

1st. Merely to protect England against invasion; or,

2d. To repel in addition all attacks against their colonies and commerce.

Although the English fleet had been greatly reduced before the outbreak of the war as a result of St. Vincent's controversy with the dockyard officials, and although the French had received the assistance of the Dutch and Spanish navies, so that the total opposing forces were nearly equal in numbers, the Admiralty's decision was that it had sufficient force to repel all forms of hostile attack.

The most satisfactory method of frustrating all forms of French attack was naturally to hold in port all Napoleon's sea forces. To accomplish this object an English squadron was placed off each port in which hostile forces were ready for sea. The English doctrine was to make the blockading force slightly superior in fighting power to the force in port.

The fighting power of a force depends upon its physical, intellectual and moral powers. In this case the physical power is measured by the number, size and condition of the ships. The intellectual and moral powers are measured by the intelligence and the resolution and spirit of the admirals, officers and crews. The condition of the English ships, excepting the Mediterranean squadron, was very much better than that of the French and Spanish ships. In intellectual and moral powers the English held a very great advantage over their opponents. The long periods at sea and the constant fighting for over 10 years had given them an excellent knowledge of seamanship, tactics and strategy, and their great naval tradition had instilled in them a wonderful fighting spirit and had given them a confidence in themselves, which gave them an almost incalculable advantage over their opponents. Their flag officers were without exception able and accomplished, and some were brilliant. The personal influence of Nelson alone has been estimated by Mahan to be equivalent to a reinforcement of three ships of the line.

On the other hand, the Spanish squadrons were just being organized and their ships being commissioned, while the French and Dutch ships had not been to sea for a long period. The excesses of the French Revolution had driven the best officers

from the service, and the discipline of the crews had never been completely restored after the mutinies in the first years of the

republic. Consequently, although there were many good officers and brave men in the Allied navies, as is shown so well by their hard fighting at Trafalgar, they were, as a rule, decidedly inferior

in intellect and resolution to the English officers and crews. The flag officers, although accomplished and personally brave, did not have the proper fighting spirit, and the traditions of their service had taught them to avoid rather than to seek battle. Finally, a fleet composed of ships of several nationalities was sure to be weakened by the jealousies which were certain to arise under such conditions.

Thus the mere numbers and size of ships alone can give no idea of the real relative fighting strength, because the English, with a considerably smaller number of ships, could, by reason of the superior quality of their personnel, count upon having equal fighting strength. It is naturally difficult to decide upon the relative fighting efficiency of the opposing forces, but we will probably be somewhere near the truth if we say that, when the units of the two opposing squadrons were equal in number, the English were superior in actual fighting strength in the ratio of approximately 4 to 3. Thus when you see Cornwallis blockading Brest with 19 units, while the French had 24 in port, you may assume that he is slightly superior. But you will note that the Admiralty rarely allowed Cornwallis' force to get as low as this, because it was a special policy of the Admiralty to maintain a considerable superiority at this most important position, and therefore they assigned to this squadron a minimum strength of 18 of the line. If we say that of these eight were three-deckers, this would give 26 units, a number approximately equal to that of the French force in port. Thus the English calculated that when their numbers were equal with those of the enemy, they had a superiority so great that defeat was practically impossible.

In accordance with their plan of blockading in port Napoleon's squadrons with English squadrons reasonably superior in fighting strength, the British Admiralty on January 1, 1805, had disposed their forces in European waters approximately as follows:

In the North Sea: Lord Keith with six two-deckers and six 50-gun ships, watching the Dutch division in the Texel and the Boulogne flotilla ..... 9 units.

In the Channel: Admiral Saumarez with a strong cruiser squadron .....

Off Brest: Lord Cornwallis, watching 24 French units in port, with approximately .....19 units.

Off Rochefort: Admiral Graves with one three-decker and four two-deckers, watching a similar force in port..... 6 units.

Off Ferrol: Admiral Cochrane with one three-decker and five two-deckers, watching five French units in port and Spanish ships preparing for sea ..... 7 units.

Off Cadiz: Admiral Orde with one three-decker and four two-deckers, watching one French unit and Spanish ships fitting out ..... 6 units.

Off Toulon: Admiral Nelson with two three-deckers and 11 two-deckers watching 11 French units in Toulon and Spanish ships fitting out in Carthagena ..... 13 units.

This gave the English a total of ships actually on the blockade of ..... 60 units.

These forces, with the exception of the Brest squadron, were sufficiently strong for their purpose. In addition, there was on the Irish station a force of three two-deckers and a large number of cruisers.

You will probably say, from an examination of the positions of these numerous squadrons, that they were dangerously dispersed, that the English had violated the cardinal principle of concentration. We have all heard so much of "concentration," that the word has become a catchword, and every one who does not keep his entire force massed together in one body is accused of failing to "concentrate." We must always remember that the degree of concentration of a force is determined by the positions of the enemy as well as our own positions, and from an examination of the actual situation you will probably agree that the English were better concentrated than were the French. As long as the situation remained unchanged the English were sufficiently concentrated, because, except for their Brest squadron, which was, however, quickly brought up to strength, their blockading squadrons were always superior in fighting power to the hostile squadrons in port. This is emphatically proved by the fact that during the entire campaign not one of Napoleon's squadrons left its port with the intention of forcing battle upon the English squadron blockading that port, except in the one case of the battle of Trafalgar, in which case you must admit the English to have been decidedly superior. But now you may bring up the case in which a French squadron might leave port, avoiding the blockading force stationed off it, and fall upon an English squadron, very inferior to itself, engaged in the blockade of another port. It must be admitted that such a change in the strategic

situation was liable to occur at any time and that, if it should occur, it would place the weaker English squadrons in a position of grave danger. Of course, the apparent way to prevent such an occurrence was to maintain the very strictest blockade at the ports in which the strongest French squadrons were stationed. But assuming that the enemy were to escape without being brought to action, there were two ways in which the danger of being attacked by superior numbers could be met. First, each squadron, regardless of the exact position of its ships of the line, kept several cruisers off the port, so that the sailing of the hostile squadron could be quickly reported to the squadron commander, the commanders of the adjacent squadrons and to the Admiralty itself. Often, when two cruisers sighted the enemy coming out, one left immediately with this information, while the other tracked the enemy, so as to determine his destination. Second, each squadron disposed a number of cruisers in a wide area around it, so as to give timely warning of the approach of a hostile squadron. In case both these methods failed and a superior hostile squadron appeared without warning, the Admiralty relied on the skill of the English commander and his captains to withdraw from their less efficient opponents and to concentrate on adjacent English squadrons. As you will see in the course of the campaign, French squadrons often escaped and came upon very inferior English forces by surprise, but in no case were they able to come up with them so as to inflict serious damage.

When the Admiralty completed their organization of the blockading squadrons, as enumerated above, they still had a considerable reserve of ships, both in commission and under repair. Let us first consider the ships ready for sea in English ports. The Channel squadron, under the command of Lord Cornwallis, was composed of:

1st. The Brest blockading squadron, under his own command;

2d. The Rochefort blockading squadron, under Graves; and,

3d. A reserve in the Channel ports, taking on water and provisions and refitting, which relieved ships in the blockading squadrons when it was necessary for them to renew their supply of water and provisions.

It is very difficult to determine the number of ships in this reserve, as, of course, its composition was changing from day to day, and we can do no more than make a rough estimate of its strength at the beginning of January. We may arrive at this as follows:

For April 15, the Naval Chronicle gives the total strength of the Channel squadron as:

10 three-deckers.
14 two-deckers.
2 50-gun ships.
A total of 35 units.

We can assume with reason that this figure is fairly accurate for January 1. Thus if we subtract from it the 19 units of the Brest force and the six units of the Rochefort force, we have a remainder of 10 units, which we may assume to be the strength of the reserve. All ships of this force could leave port on 24 hours' notice.

In addition to this first reserve, as we will call it, there were, in what we will call second reserve, the following ships of the line:

Two ships under orders for the India station.
Four ships manned and ready to go into commission.
The *Hibernia,* 110, and the *Revenge,* 74, building and practically completed.
A total of nine units which could get to sea in from one to three weeks.

Finally there were 19 units in third reserve, a proportion of which could be placed in commission, depending upon the exertions of the English in making repairs and collecting crews.

We may now sum up the opposing forces in Europe as follows:

French and Allies:	
Ready for sea	53 units.
Fitting out	30 units.
Total (approximately)	83 units.
English:	
Actually at sea	63 units.
First reserve, ready in 24 hours	10 units.
Second reserve, ready in three weeks	9 units.
Total (approximately)	82 units.
In addition third reserve (approximately)	19 units.

On the foreign stations there were the following English ships of the line:

India Station (Admiral Rainier):

Five 74's
Three 64's
Two 50's
..... 9 units.

West Indies Station:

1. Leeward Islands (Commodore Hood): Two 74's.. }
2. Jamaica (Admiral Dacres): Two 74's..... } ..... 4 units.

Total in full commission on foreign station (nearly all very old ships, and probably in poor repair).....13 units.

It is very possible that you will criticize this disposition of 13 units at such great distances from the main battle squadrons. You may even quote Napoleon as saying: "When you have resolved to fight, collect all your forces. One battalion may decide the day." If I admit that this is a true principle, then you will claim that the English blockading squadrons were "resolved to fight" should the French attempt to escape, and you will say that every possible ship should be used to reinforce the blockading squadrons up to their greatest possible strength. But if you resolve to fight, the enemy will often, on the sea, resolve not to fight, and will do his best to evade you. The question we must decide is whether a fleet in port may run the blockade without having to fight the blockading fleet, which is resolved to fight. If it cannot escape without a fight, then all ships should be used in the blockading squadron. If it has good chances of escaping, then under certain conditions it may be advisable to use a number of the ships to form squadrons on foreign stations as a second line of defence. Under the conditions of naval warfare to-day, it will be very difficult for blockaded squadrons to escape without a battle, and thus all the ships will under normal conditions be used in the blockading squadron—the first line. Under the conditions of naval warfare in 1805, on the other hand, it was very easy for small squadrons to run the blockade, and thus the use of a small number of the poorest ships as a second line on the foreign stations might under some conditions be justified.

Let us see just what the conditions were, and the chances for the enemy to undertake successful expeditions against the English colonies and commerce. First, take the case of India. This most important colony was at a great distance from home. If a hostile squadron were to leave France for an expedition in Indian waters,

it would get a great start before the English could determine its destination. The most important points on the route, Cape of Good Hope and Mauritius, were in Napoleon's hands and this would greatly assist a French squadron headed toward India and retard an English squadron in pursuit. The hold of the English in India was far from secure, even though the wars against Tippoo Sahib had been brought to a successful conclusion; and a small French landing force with the assistance of the natives might accomplish great results, if the command of the sea could be retained. That Napoleon would send out such an expedition certainly seemed probable, as his Egyptian expedition had been an attempt to reach India, and even in 1805 there were rumors, based on sound facts, to the effect that he intended to send a strong squadron to Indian waters. Finally, the presence of the *Marengo* and four Dutch ships of the line, poorly conditioned it is true, in the East Indies called for an equal English force to hold them in play.

While all the English possessions in the West Indies were within a comparatively small area, the steady easterly trade winds in reality formed two distinct stations, Jamaica and the Leeward Islands, as it required at least a month to beat against the wind from the former station to the latter. This fact practically doubled the forces required for their defence. While the West Indies were much nearer home than India, still about a month and a half was required for ships of the line to make the trip, and at least a month for fast cruisers. Thus, if a French squadron were to break the blockade and, avoiding contact, make for the West Indies, it would take about one and a half months for it to reach its destination, and another month for the news of its arrival to reach England. It would have a free hand in the islands for about two and a half months, in which time it should be able to achieve considerable results.

We may sum up the reasons for using the 13 units in question either with the blockading fleets or on the foreign stations as follows:

1st. By using them with the blockading squadrons they would:

(a) Assist in repelling the invasion of England; and,

(b) Assist in repelling attacks against English commerce and colonies only if the attacking squadron could be intercepted when it left port.

2d. By using them on foreign stations they would:

(a) Not assist in repelling the invasion of England; but

(b) Would assist in repelling attacks against English commerce and colonies, should the attacking force not be intercepted when it left port.

Thus the use of these ships as a second line of defence for the English commerce and colonies could be justified only if the English forces in European waters were sufficiently strong, and would be sufficiently strong in the future, to defeat in battle all French and Spanish squadrons which might put to sea, either to assist in the invasion of England or to operate against English commerce and colonies. Whether the English blockading squadrons were sufficiently strong for this purpose at all times during the campaign is a matter upon which I would hesitate to give my opinion. They were certainly strong enough in the first part of the campaign, and it must have been a great relief to the Admiralty, when they received the reports of the escapes of Missiessy, Villeneuve and Allemand, to know that they had squadrons of heavy ships in Indian and West Indian waters. At the great crisis of the campaign, when the combined fleet of 30 units was at Ferrol, Lord Barham very possibly did not consider his forces in European waters entirely sufficient, and without doubt he would have been glad to have had the Indian and West Indian squadrons in the Channel. However this may be, it is certain that the English showed great confidence in their navy in thus maintaining such a large force in foreign waters. And it is also certain that, as it actually worked out, the results vindicated this confidence, for England was everywhere victorious on the sea.

SECOND LETTER

1. NAPOLEON'S FIRST MOVE

The most satisfactory operation for Napoleon was naturally to strike directly at England, to concentrate a superior force in the Channel to cover the crossing of the flotilla and of Marmont's force to England. This operation was also thoroughly in accord with Napoleon's principles of waging war. To effect this naval concentration, Napoleon had in Europe a total of 53 units, all French except the six Dûtch ships in the Texel. As the English had at the beginning of the campaign 63 units actually at sea

and 10 more in the Channel ports ready to sail in 24 hours, and as the English were, ship for ship, considerably superior in efficiency to his own forces, it was evident that there was at present little hope for the success of his ambitious project. But by the end of March the Spanish had promised to have 30 units ready for sea, and when these ships were ready there would be far better chances of success. Therefore, you must admit that it was entirely proper for Napoleon to delay his major project until the Spanish ships would be available. As the major operation, therefore, could not be commenced at present, Napoleon had the choice of keeping his ships idle in port or of using them in minor operations against the English commerce and colonies. These operations, if successful, would have a certain moral effect, would allow the French ships to be shaken down by long cruises at sea, would train the personnel, and might deceive the English as to his ultimate purpose and draw away English squadrons from the more important European stations at the time when the major operation would commence. Napoleon, therefore, rather than allow his ships to lie idle in port, decided to use several of the French squadrons in minor operations, which might rather be called "raids." The raids, however, were not to interfere with the major operation, the invasion of England; for Napoleon was very careful to provide that all ships used in the raids should be back in their home ports in time to take part in this operation.

Napoleon, therefore, issued orders for the Rochefort and Toulon squadrons to sail for the West Indies. In making a detailed statement of the various orders issued throughout the campaign, I will follow a regular form:

1st. The assumption made as to the probable intentions of the enemy.

2d. The general plan assigned to our own forces.

3d. The detailed instructions to each one of the subdivisions of our own forces.

In practically all cases, the assumption and the general plan were not embodied in the actual orders, only the instructions to the subdivisions being given.

Napoleon's order will therefore be put in the following form:

CAMPAIGN ORDER NO. 1. ABOUT JANUARY 5

1. Assumption as to enemy intentions—None.

2. General plan—To raid the English colonies in the West Indies, thus drawing English forces there from Europe.

3. (a) The Rochefort squadron, Rear Admiral Missiessy, to sail for the West Indies at a set date, avoiding the blockading squadron, and meet the Toulon squadron there.

(b) The Toulon squadron, Vice Admiral Villeneuve, to sail at the same time, and pick up Missiessy in the West Indies.

(c) The united force to operate against the English colonies and commerce in the West Indies until the early spring, when they should return to Ferrol, rally the 15 ships which would be there ready for sea by that time, and proceed to a French port.

(d) If only Missiessy should reach the West Indies, he was to reinforce the French garrison at San Domingo with the troops he carried and then return home.

Thus this plan was designed not only as a blow at the English commerce and colonies in the West Indies, but also to form a concentration of about 35 units in a French port for the major operation itself. At the same time that the above order was sent out, Napoleon issued the following:

SPECIAL ORDER. ABOUT JANUARY 5

Admiral Ganteaume to leave Brest with his entire squadron, make a descent upon the Irish coast, sail around Scotland and join the Dutch squadron in the Texel.

While we have no proof, it appears very probable that this order was given out especially for the benefit of the English spies and that its execution was never intended.

In accordance with his orders Missiessy sailed from Rochefort on January 11. His squadron consisted of the following ships:

Majestaeux	120 guns.
Magnanime	80 guns.
Lion	74 guns.
Suffren	74 guns.
Jemappe	74 guns.
A total of	6 units.

Five cruisers. On the ships were 3500 troops.

When Missiessy left port, the English blockading force under Graves very fortunately happened to be at Quiberon Bay, about 130 miles northwest of Rochefort, taking on stores, only two cruisers remaining on watch off the port. The French squadron ran into a heavy storm and was very severely damaged, but Missiessy resolutely kept on his way. The English cruisers followed Missiessy through the first part of the storm, and seeing the great damage received by the French squadron, left to inform Graves.

The storm prevented the cruisers from reaching Graves until January 16, six days after Missiessy had left port. By this time the French squadron was so far on its way that there was no chance for Graves to intercept it.

Now suppose that you were in the place of the English Admiralty, what course of action would you take? First you would have to determine the destination of the French squadron. It is impossible for you to say that it must have one of a certain set number of destinations, but you might say that its actual destination would most probably be one of the following:

1st. A French port in the Bay of Biscay.
2d. The Mediterranean.
3d. The West Indies.
4th. India.

A return to a French port in the Bay of Biscay, caused by damage received in the storm, would renew the original situation. A move into the Mediterranean would very probably be intercepted by Orde with six units of the Cadiz blockading squadron, but if Orde could be evaded and the Mediterranean be reached, the French would have 17 units there as against 13 for Nelson, not counting the Spanish ships fitting out at Carthagena. A move to the West Indies could not be intercepted by any English squadron, and would give the French six units as against the four old 74's the English had there. A move to India would give the French seven units there to the English nine, not counting the four Dutch ships which very probably were not ready for sea. Thus we see that the West Indies was the danger point for the English, as it was on that station that the French had the greatest chance of inflicting damage upon the English commerce and colonies. Now perhaps you will say that the Admiralty should have immediately sent a squadron to the West Indies on the assumption that Missiessy was headed in that direction. I cannot agree to this, as it would have been a blow in the dark based on a mere guess, and not sound strategy. On the other hand, I claim that the Admiralty now gave an excellent example of the manner which to methodically clear up an obscure strategic situation. They decided to clear up in turn each possible course of action of the French squadron. In deciding upon the course of action to clear up first they took the one which would lead to a destination nearest to England because:

1st. This course could be cleared up in the shortest time; and,

2d. It was highly desirable to retain the force, detached in pursuit of Missiessy, as near the Channel as possible, until all destinations in European waters had been covered and it was practically certain that Missiessy was bound for a foreign station. A false move to a distance, unless it was certain that Missiessy was being followed, might mean the loss of a number of units for several months, thus playing into Napoleon's hands, if he really intended to carry out operations in home waters.

In accordance with these sound principles the Admiralty decided:

1st. To cover the possibility of a return to a French port in the Gulf of Biscay.

2d. To cover the possibility of a move toward the Mediterranean.

3d. To cover the possibility of a move to the West Indies.

4th. To leave India out of consideration for the present.

In accordance with this plan orders were given to look into all French ports in the Gulf of Biscay to determine the presence of the Rochefort squadron. As Cornwallis had been driven off his station by the storm the following ports had to be examined:

Brest, Rochefort and L'Orient.

By reason of exceptionally poor weather conditions it was not until about February 7, nearly a month after Missiessy had sailed, that it was determined that he had not returned to any of these ports. Thus the first possibility had been cleared up, and a squadron, equal to Missiessy's, could be safely sent away from the Bay of Biscay in pursuit of it, first clearing up the possibility of a move toward the Mediterranean, and then that of one toward the West Indies. Accordingly, the Admiralty gave the following orders to Cornwallis, who had in the meantime called in Graves to the main body of the Channel squadron off Brest:

CAMPAIGN ORDER NO. 1. FEBRUARY 7

1. Assumption—Missiessy en route toward the Mediterranean or the West Indies.

2. General plan—To follow Missiessy with a superior force.

3. (a) Cornwallis to send Rear Admiral Calder with six units to relieve Rear Admiral Cochrane off Ferrol.

(b) Cochrane with his entire force of seven units to go to Lisbon for information and to speak to Orde off Cadiz. If he heard that Missiessy had entered the Mediterranean, Cochrane was to reinforce Nelson with his entire force.

(c) If there were no news of Missiessy, Cochrane was to touch at Madeira and then at the Cape Verde Islands for news. If he received reliable information as to Missiessy's destination, he was to follow him. If he received no news, he was to assume that he had gone to the West Indies, and sail for Barbadoes.

(d) There were other instructions regarding his actions after he arrived in the West Indies which we will consider later.

In accordance with these orders Calder relieved Cochrane in the last week of February, and the latter sailed for Lisbon. His squadron consisted of the following ships of the line:

St. George	98 guns.
Northumberland	74 guns.
Eagle	74 guns.
Atlas	74 guns.
Spartiate	74 guns.
Veteran	74 guns.
A total of	7 units.

Cochrane touched in turn at all the points ordered, and, receiving no information of Missiessy, sailed for Barbadoes, where he arrived April 5. Missiessy had arrived at Martinique on February 20, just a month and a half before. Thus the Admiralty, by using sound and methodical strategy had lost a month and a half before the move of the enemy could be countered. Thus we see that the side which holds the initiative is always ahead of the enemy in the matter of time, because the latter has always to discover the move of the former and then make arrangements to counter it. If the side on the defensive does not wish to lose time, then he must make a stab in the dark, based upon a mere guess of his opponent's intentions. Thus the side having the initiative has always a great advantage, and this advantage is especially great in naval warfare, where it is so difficult to determine the intentions of the enemy. In land warfare one side may act on the offensive, take the initiative and retain it throughout the campaign. In war on the sea there is a peculiar condition which makes this impossible. The stronger side may act on the offensive and retain the initiative as long as the opposing forces keep the sea, but when they retire into securely fortified ports, then the stronger side must change from the attack to the defence, and the initiative

passes over to the enemy. Thus the stronger side, while it may gain the temporary command of the sea, can never gain a definite decision over the enemy naval force, unless the enemy gives him the opportunity, and not only is he prevented from gaining a definite decision, but he must pass over to the defensive and give the advantage of the initiative over to the enemy, who may select the time and the place for further operations.

Let us now see how events were marching in the Mediterranean. On January 17, six days after Missiessy's escape, Villeneuve sailed from Toulon for the West Indies in accordance with the Emperor's orders. His squadron was composed of the following ships of the line:

Bucentaure	80 guns.
Neptune	80 guns.
Formidable	80 guns.
Indomptable	80 guns.
Pluton	74 guns.
Mont-Blanc	74 guns.
Berwick	74 guns.
Atlas	74 guns.
Swiftsure	74 guns.
Scipion	74 guns.
Intrepide	74 guns.
A total of	11 units.

In addition he had nine cruisers, and he had embarked on his ships a large number of troops.

At the time of Villeneuve's sailing Nelson was at Maddalena Islands at the northern point of Sardinia with all his ships of the line, 13 units in all. Two of his frigates were watching Toulon in his absence. Villeneuve, upon leaving port, steered for the southern point of Sardinia. He ran into a very severe storm which caused great damage. The two English frigates followed him through the storm until the early morning of the 19th, when the French squadron was in the latitude of Ajaccio, Corsica, steering SSW. At this point they left for Nelson, whom they reached after dark that same day. As one French ship was forced to put into Ajaccio dismasted, and as three other ships were disabled, and all the other ships in very bad condition, Villeneuve decided the same day to return to port. He reached Toulon on the 21st without further loss. All his ships, including the one dismasted, were able to get back safely.

Now place yourself in Nelson's position and estimate the situation on the night of the 19th, when he received the reports of his frigates. The first plan which would occur to you, and one which Nelson surely must have considered, would be to head directly for the French fleet and force battle upon it. This would solve all his problems, if the French squadron could be found. But how was it to be found? No English ship was still with it to give him further information of its movements. If he were to guess at the probable course and speed of Villeneuve and set a course to intercept him, it would be a mere blow in the dark, with the chances in favor of Villeneuve's escaping without detection. If Nelson were to miss the enemy by such a move, so much precious time would be wasted that Villeneuve would have a long start on his way to the place selected for attack. Thus Nelson had a problem very similar to that which the Admiralty had been required to solve after Missiessy's escape. His solution was exactly similar to that made by the Admiralty. He recognized three general courses of action open to Villeneuve:

1st. An attack upon English possessions in the Mediterranean.

2d. A return to port, due to damage received in the storm.

3d. A move out into the Atlantic.

In case the French returned to port, then they would be so damaged that they would not be able to undertake any operations for some time, so no immediate danger would result from this course of action. In case they had left the Mediterranean, they would fall upon Orde and Cochrane and would be in a position to do the English great injury, but as Nelson was responsible for the Mediterranean station it would certainly not be proper for him to leave it until he was certain that the French had left it, especially as Villeneuve's course so far to the eastward would seem to indicate that he was about to attack English possessions in the Mediterranean, and as Napoleon, that master of deception, had been moving troops into Italy, as if to embark them for an oversea expedition. Thus if Nelson were to clear up the situation logically and methodically it would be proper for him to:

1st. Take a position with his ships of the line to cover the English possessions in the Mediterranean.

2d. To reconnoiter Toulon with cruisers, with a view to determining the presence of the French squadron.

3d. After it was proved that the French squadron had left the Mediterranean, to leave a few cruisers on the station and follow it with the remaining force.

This was exactly Nelson's decision.

The English possessions, or rather those belonging to allies and thus under English protection, can be divided into two groups:

1st. The center Mediterranean group: Sardinia, Sicily, Naples and Malta.

2d. The eastern Mediterranean group: Greece, Corfu, Turkey and Egypt.

The most natural and the easiest way for Nelson to protect all these widely scattered territories was for him to hold the line: Corsica-Sardinia-Tunis. If he observed this line with his frigates, and took up a position with his squadron at the southern end of Sardinia, he could probably intercept Villeneuve and force battle upon him. This then was Nelson's plan. Sending out his frigates to observe the line, he got under way immediately and stood down the eastern coast of Sardinia. On the 22d he had reached a point 50 miles east of Cagliari, a city at the southern end of Sardinia, when one of his frigates reported that a French frigate had been sighted standing into that port. Nelson naturally believed that this ship was accompanying the main French force and at once headed toward it. But here a strong westerly gale sprang up and prevented him from reaching Cagliari until the 26th. Here he discovered that no French ship had been in port. On the next day word was received that a French ship of the line had put into Ajaccio. Neglecting the possibility of a move into the Atlantic it was now practically certain that Villeneuve had either put back into port or passed between Sardinia and Tunis, which part of the line the storm had prevented the frigates from covering. Nelson personally believed that Villeneuve had gone back to Toulon, but if this was so all was well no matter what he did. Therefore he assumed that Villeneuve had passed south of Sardinia. If Villeneuve had taken this course, he had two possible moves:

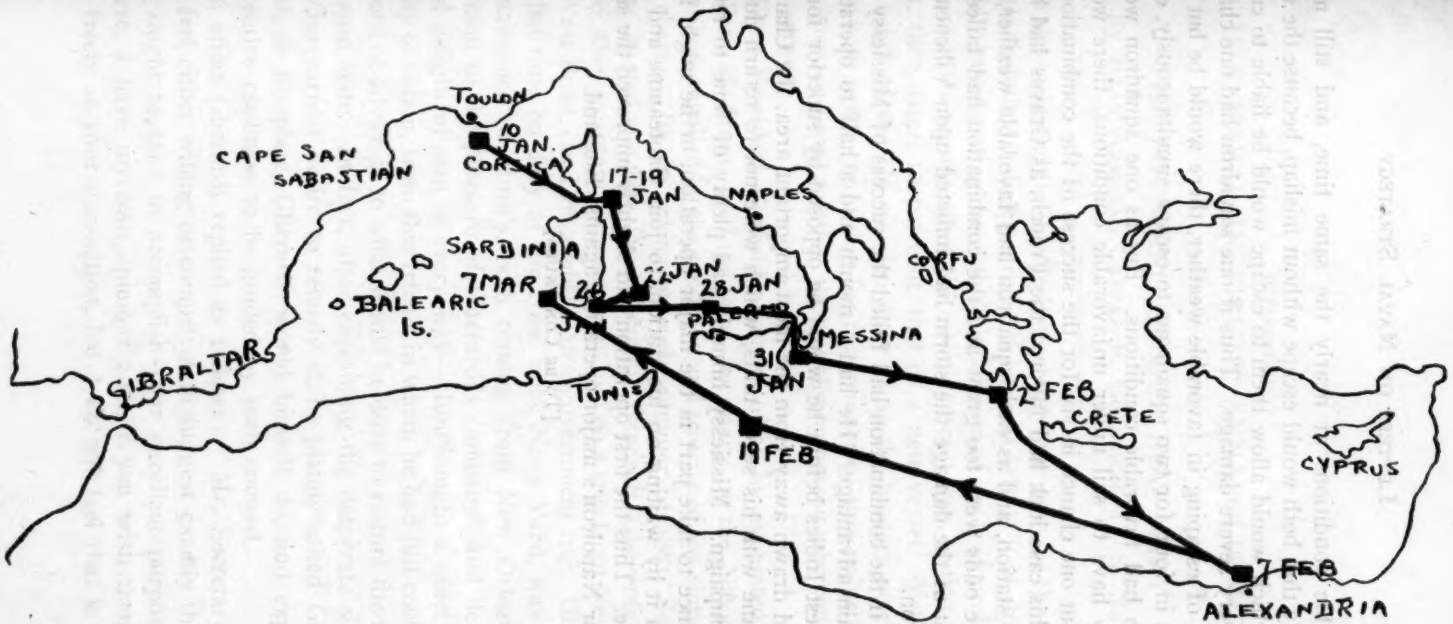
1st. A course to the northward of Sicily for an attack against Sicily or Naples.

2d. A course to the southward of Sicily for an expedition into the eastern Mediterranean.

Nelson naturally determined to clear up the first course, as this could be done quicker. He therefore went to Palermo, arriving there on the 28th. By this time it was practically certain that the middle Mediterranean was secure. The next course of the enemy to cover was that to the southward of Sicily into the eastern Mediterranean. Therefore, Nelson, sending back three frigates to reconnoiter Toulon, kept on through the Straits of Messina for Greece. Touching there, he received no news of Villeneuve, but heard that France had broken off relations with Turkey. This made it look as if Villeneuve had gone to Egypt, but when he arrived at Alexandria, there was no news of the French. Nelson hurried back to Sardinia. Arriving there about the beginning of March, he heard that Villeneuve was back in Toulon. Provisioning his ships, he was back off Toulon on March 13 with all his ships of the line. Nelson had acted in accordance with sound strategic principles. He had left nothing to chance and had made no blow in the dark where failure to find the enemy would have disastrous results. He had gone to each threatened point in turn with his whole force, and had waited at each point until he could eliminate one of the enemy's possible courses of action. When he finally proved that the French squadron had not passed the line Corsica-Sardinia-Tunis, then he had gone back to Toulon. If Villeneuve had not been there, his next move would have been to have left the Mediterranean in pursuit. When we see that, even though Nelson acted correctly, Villeneuve, if he had been able to have kept on through the Straits, would have gained a start of two months, we have an additional proof of the value of the initiative and of the time required for the defender to counter the move of the attacker. Even as it turned out, Villeneuve, by a mere feint at a move, had been able to send Nelson completely around the Mediterranean.

Ganteaume's orders, which were probably never intended to be executed, were countermanded.

Napoleon's first plan had failed. Its greatest weakness was that it required two squadrons to break their blockades almost simultaneously. In order to have reasonable chances of success in breaking the blockade, which was very efficiently maintained by the English squadrons, a squadron required very favorable weather, usually a storm with a favorable wind. It would very rarely happen that two widely divided squadrons would both have these



NELSON'S FIRST MEDITERRANEAN CRUISE, 1805.

favorable conditions at nearly the same time, and still more unlikely that both would escape without mishap, because the very gale which would allow them to escape would be liable to cause them very severe damage. Thus if one squadron had one chance in two of escaping in favorable weather, there would be but one chance in four for two squadrons to escape simultaneously, even if each had favorable conditions. But as one squadron would usually have to sail under unfavorable conditions, there would be about one chance in six for the success of the combination.

In this case luck had favored the French, as Graves had been off his station, and as each squadron had favorable weather, but still the odds were too great and the combination had failed on account of the damage the storm had inflicted upon Villeneuve's squadron.

But if the combination had failed the success of Missiessy had a certain advantage. He had a month and a half to operate in the West Indies before he would be opposed by superior forces. He had drawn away from the most important area, the Channel, Cochrane with his seven units, which were not to return during the campaign. Missiessy himself had plenty of time to return to France to take part in the major operation, or he might fill a part in it by waiting on his station, to join Ganteaume and Villeneuve. Thus the first operation had slightly improved the situation for Napoleon's major operation against England.

[To be Continued]

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE FOUNDING OF OUR NEW NAVY

By Rear Admiral Caspar F. Goodrich, U. S. Navy

In the early eighties of the last century, the navy of the United States had almost disappeared. What was left of it in ships was rapidly passing away through the operation of the laws prohibiting repairs to its vessels when the estimated cost was, at first, 25 per cent, then, later, 10 per cent, that of a new vessel. Yet out of the ashes of the old wooden navy arose the modern steel navy. To whom is the credit due for the manner of this re-birth? To this question I am, possibly, the only living person who can supply the answer.

When President Garfield assumed office he appointed Judge William H. Hunt, of Louisiana, Secretary of the Navy. The latter was appalled by the condition and paucity of the ships under his charge. In the spring or early summer of 1881, Secretary Hunt invited the late Rear Admiral Bancroft Gherardi, U. S. Navy, then a captain, to accompany him on a trip from New York to West Point (as I remember) on a government tug. Gherardi, at that time on duty at the New York Navy Yard, was an old acquaintance of Hunt's, both coming from New Orleans. In addition to the pleasure of Gherardi's company—and he was a most delightful man in every way—Hunt sought a quiet opportunity to obtain, from this friend, in whom he had full confidence, a word of advice as to what should be done to restore the navy to a sound state. In fact, after explaining the desperate situation and his earnest desire to remedy it, he plainly asked Gherardi what, in his place, Gherardi would himself do, and expressed his entire readiness to be guided by such counsel.

In effect Gherardi replied as follows: "Mr. Secretary, I do not feel either willing or competent to suggest exactly the steps you ought to take to accomplish your excellent purpose. Of course, I have my own opinions and, if you wish them, they are freely at your disposition, but I do not feel that it is well

that you should be influenced by any one person, no matter how firm his convictions and wide his experience. You have honored me by asking what I should do were I in your place—a very different matter. In that case, I should trust to no single individual, but would form a board composed of the ablest available officers of the line, the engineer corps and the construction corps. To this board I would refer the whole subject, both as to general policy and types of vessels required. In this way I would get the benefit of the best brains in the service, after which, I should adopt the recommendations of this body of experts and seek to carry them out. I should then be able to move in the full assurance that I was doing the very best thing possible."

Such, in substance, is the story I heard from Gherardi's own lips soon after the occurrence of the episode here related.

It is of common knowledge that what Gherardi suggested, Hunt did. With President Garfield's approval he formed the first advisory board. Rear Admiral John Rodgers was its president. To Rodgers were joined eight other line officers; three engineers, Isherwood, Loring and Manning; three constructors, Lenthal, Wilson and Hichborn. Their report formed the basis of the navy's reconstruction.

The excellent work of Secretary Chandler and the second naval advisory board, authorized by the Act of 1882, the far-seeing vision of Chandler's successor, Secretary Whitney, which made possible the establishing of an armor plant at Bethlehem, etc., are all matters of history. While recognizing the wisdom of Secretary Hunt in going to a trustworthy source for counsel and in acting promptly and forcefully upon that counsel, in justice to the memory of my dear and modest friend I claim that the admirable manner in which the navy of to-day took practical shape is, unquestionably, due to my old commander, Bancroft Gherardi. He it was who planted the seed from which has grown this mighty tree.

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A NEW METHOD OF USING ALTITUDE AND AZIMUTH TABLES TO OBTAIN A SHIP'S POSITION AT SEA

By Lieutenant Abner B. Clements, U. S. N. R. F.
Class of 1879, U. S. N. A.

In the old navigation we worked our sights solely for longitude and latitude. We took a set of sights for latitude either on the meridian or near the meridian or at a known time from the meridian and reduced it to the meridian, or we took a set of sights of a body on the prime vertical or near the prime vertical, and, assuming a latitude, worked out the corresponding hour angle and thence the longitude.

After discovery of the Sumner line we saw that our sights did not give us the true positions that we thought they did. That the latitude sight did not give us an exact latitude unless the body observed was exactly on the meridian, that if off the meridian the result was affected by our guess as to the longitude. And, that our longitude sight gave us longitude only when the body observed was exactly on the prime vertical, otherwise the longitude obtained depended largely upon our guess at the latitude.

The new navigation took into account all this, and is founded upon the fact that an altitude of a celestial body simply gives us the radius of the circle upon which is located the observer. Bearing in mind that when this radius is over 10° of arc, such a portion of the circle as may include all possible positions of the observer is to all practical purposes a straight line, the new navigation treats it as a straight line, at right angles to the line of bearing of the observed body, since the arc of a circle makes a right angle to the radius at every point; and plots the position on the chart, or computes the position from the length of this radius, which is the zenith distance of the observed body. If the earth were a plane, or if we had a chart of the earth on which we could lay off

this distance as a straight line, we could plot the position of the observed body by its hour angle from Greenwich and its declination as though these were terrestrial longitude and latitude, and with the zenith distance as a radius lay off the line of position at once without computation. But as this would require a chart about 60 feet square it is impracticable. The best we can do is to compute, or in some other way arrive at, and plot a part of a circle with a radius approximating to the observed zenith distance and then lay off on the line of bearing the difference between this approximate radius and the true radius or observed zenith distance.

In the method of Saint-Hilaire we assume a position, and with this position as one point and the position of the observed body determined by its declination and Greenwich hour angle as the other, we can compute the great circle distance between the two. The difference between this distance and the observed distance shows us how much our assumed position is in error, and we then lay off from our assumed position the amount of this error, on the line of bearing of the observed body, taking the direction of the line of bearing from the azimuth obtained from observation or from the Azimuth Tables.

The method of Saint-Hilaire utilizes tables of haversines in this computation and by avoidance of plus and minus signs relieves the solution from ambiguity, but otherwise it has no advantage; in fact, some disadvantage as compared with the old altitude and azimuth problem and which gave both the altitude and the azimuth in one solution.

The so-called newest navigation of de Aquino is a republication by him with improved methods of use of the tables of Sir William Thompson, afterwards Lord Kelvin, for the ready solution of the old altitude and azimuth problem.

The old way of solving the altitude and azimuth problem was by Napier's rules, which were, that in a right-angled spheric triangle if we consider that triangle as made up of only five parts ignoring the right angle, these parts being the two sides, the complement of the hypotenuse and the complements of the two oblique angles, the sine of the middle is equal to the product of the tangents of the adjacent parts or the product of the cosines of the opposite parts.

Since these rules are general, we see we can go around a right-angled spheric triangle as we please, choosing any part as the

middle part, and the above proportion still holds so long as we are careful to observe the relation of adjacent parts and opposite parts to the middle part.

To solve an oblique-angled spheric triangle then, we simply divide it into two right-angled spheric triangles and solve by Napier's rules.

In the solution of the old altitude and azimuth problem we dropped the perpendicular from the observed body upon the meridian passing through the observer and solved by the formulæ obtained from Napier's rules:

$$\sin(90^\circ - t) = \tan\phi \tan d, \text{ whence } \tan\phi = \cot d \cos t. \quad (1)$$

$$\left.\begin{aligned} \sin h &= \cos a \sin(L+\phi) \\ \sin d &= \cos a \cos\phi \end{aligned}\right\} \text{whence } \sin h = \sin(L+\phi) \sin d \sec\phi. \quad (2)$$

$$\left.\begin{aligned} \cos(L+\phi) &= \tan a \cot Z \\ \sin\phi &= \tan a \cot t \end{aligned}\right\} \text{whence } \cot Z = \cos t \cos(L+\phi) \operatorname{cosec}\phi. \quad (3)$$

Sir William Thompson about 1876 published a table giving the values of parts of right triangles for each even degree, and published a method of using them substantially the same as method I of de Aquino.

Lieutenant de Aquino carried the tables to 30′ on the perpendicular, and provided columns for the interpolation and used the letters of astronomical triangle and carried them in various combinations showing the various ways in which the tables could be used, instead of leaving the K and Q of Lord Kelvin and the application to be worked out by the navigator in each case. However, the manner of using the tables was essentially the same, and both followed the old altitude and azimuth problem and dropped the perpendicular from the observed body upon the meridian of the observer. In the old altitude and azimuth problem the perpendicular was dropped in this way, because of greater convenience in calculation. The rule was that the perpendicular should be dropped from the end of a given side and opposite a given angle, and generally to be so dropped as not to split a wanted part. Consequently, as the position angle was not wanted and the azimuth was, the perpendicular was so dropped as to split the position angle and not the azimuth. But when the calculation is not to be made, as in the use of the tables of Lord Kelvin and Lieutenant de Aquino, the reason for dropping the perpendicular in this manner no longer holds.

The tables published as Table VI in H. O. 200, and there credited to Lieutenant Radler de Aquino, were published about 1876 by Lord Kelvin, then Sir William Thompson. Lieutenant de Aquino merely devised a more convenient way of using them. The following is an explanation of a much more convenient way than that given by either Lord Kelvin or Lieutenant de Aquino:

Table VI of H. O. 200 is a table of right-angled spheric triangles. The special use of such tables is in the solution of oblique-angled spheric triangles, the oblique-angled spheric triangle being divided into two right-angled spheric triangles by means of a perpendicular let fall from the end of a given side and opposite a given angle.

In the method of Lord Kelvin and in the various methods of Lieutenant de Aquino, the astronomical triangle is divided into two right-angled spheric triangles by dropping a perpendicular from the observed body upon the meridian of the observer.

It is, however, more convenient to drop the perpendicular from the zenith upon the meridian passing through the observed body, even though this violates the rule against dropping the perpendicular so as to split a wanted part.

Fig. 1 represents the astronomical triangle projected upon the plane of the horizon. Then, using the ordinary notation of navigation, PZM_1, PZM_2, PZM_3 and PZM_4 represent the various cases that may arise.

In PZM_1, the hour angle is greater than 90°:

$$mM_1 = mP + M_1P = 90° - b + (90° - d) = 180° - (b + d),$$

and the angle $PZM_1 = mZ\ M_1 - MZP = \beta - a$.

In PZM_2, mP is greater than M_2P, $d > b$:

$$mM_2 = mP - M_2P = 90° - b - (90° - d) = d - b,$$

and the angle $PZm_2 = mZP - mZM_2 = a - \beta$.

In PZM_3, mP is less than M_3P, $b > d$:

$$mM_3 - M_3P - mP = 90° - d - (90° - b) = b - d,$$

and the angle $PZM_3 = mZP + mZM_3 = a + \beta$.

In PZM_4, where the declination is of opposite sign to latitude mP is less than M_4P, $b > d$ (regarding d as negative):

$$mM_4 = M_4P - mP = 90° - d - (90° - b) = b - d,$$

and the angle $PZM_4 = mZP + mZM_4 = a + \beta$.

Whence we have the rules:

1. Where t is greater than 90° (enter the table with $180°-t$): $C=180°-(d+b)$ and $Z=\beta-\alpha$.
2. Where t is less than 90° and $d>b$: $C=b\sim d$ and $Z=\alpha-\beta$.
3. Where t is less than 90° and $b>d$: $C=b\sim d$ and $Z=\alpha+\beta$.

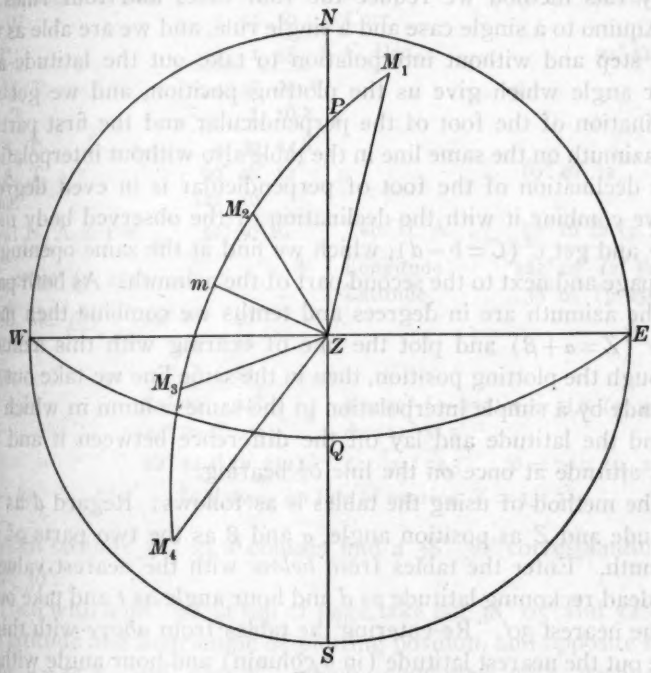

FIG. 1.

$PZ=90°-L.$
$PM_1, PM_2, PM_3, PM_4=90°-d.$
$Pm=90°-b.$
$mM_1, mM_2, mM_3, mM_4=90°-B=C.$
$ZPM_1, ZPM_2, ZPM_3, ZPM_4=t.$
$PZm=\alpha.$
$mZM_1, mZM_2, mZM_3, mZM_4=\beta.$

An easy way to apply these rules is to note that if we always regard the declination as measured from the upper branch of the equator, then in all cases $C=b\sim d$, and we have the single rule:

When the hour angle is greater than 90° take $180° - t$ instead of t and $180° - d$ instead of d; then, $C = b - d$. β has the sign of C and $Z = a + \beta$.

Z is always measured from the elevated pole regardless of sign, to the east or west as the hour-angle is the east or west.

By this method we reduce the four cases and four rules of de Aquino to a single case and a single rule, and we are able as the first step and without interpolation to take out the latitude and hour angle which give us the plotting position, and we get the declination of the foot of the perpendicular and the first part of the azimuth on the same line in the table also without interpolation. The declination of the foot of perpendicular is in even degrees, so we combine it with the declination of the observed body mentally and get C ($C = b - d$), which we find at the same opening of the page and next to the second part of the azimuth. As both parts of the azimuth are in degrees and tenths we combine then mentally ($Z = a + \beta$) and plot the line of bearing with this azimuth through the plotting position, then in the same line we take out the altitude by a simple interpolation in the same column in which we found the latitude and lay off the difference between it and the true altitude at once on the line of bearing.

The method of using the tables is as follows: Regard d as the latitude and Z as position angle, a and β as the two parts of the azimuth. Enter the tables from *below* with the nearest value to the dead reckoning latitude as d and hour angle as t and take out a to the nearest 30′. Re-entering the tables from *above* with this a, take out the nearest latitude (in d column) and hour angle without interpolation, these give the assumed position to be used instead of the dead reckoning position. On the same line with these take out b and a, combine b with the declination ($C = b - d$) and obtain C. From C by a simple interpolation get h_c and β and combining a and β get Z, the azimuth. Comparing calculated altitude h_c with the observed h_o gives the altitude difference, which is laid off from the assumed position on the line determined by the azimuth either toward or away from the observed body, as the observed altitude h_o is greater or less than the computed altitude h_c. Then draw a line of position or Sumner line at right angles to the line of bearing.

Example 1.—January 11, 1918, a. m., sextant altitude of sun's lower limb, 12° 10′ 40″ bearing S. and E.; W. T., $8^h\ 53^m\ 00^s$;

C—W, $7^h\ 55^m\ 50^s$; C. C., $1^m\ 55^s$; height of eye, 18 feet; I. C.+ 1′ 30″; approximate position, latitude 38° N., longitude 122° 16′ W.

SOLUTION IN DETAIL

	h	m	s		
W. T. obs. + 12 hrs.	20	53	06	Dec.	21° 51.8′
C—W	7	55	50	Corr.	.3
C. C.		1	55	C. Dec.	21° 51.5′ S.
G. M. T.	4	47	01		
Eq. T.		7	56.2		
G. A. T.	4	39	04.8		
G. A. T. arc	69°	46′	12″		69° 46′ 12″
Long.	122	16			
Local H. A. = t =	52°	30′	E.	Tab. H. A.	52° 16′ E. (p. 253).

a = 38° 30′ (p. 253). Longitude 122° 02′ 12″ W. Latitude 38° 05′ (p. 253).

Obsd. alt. ⊙	12°	10′	40″
I. C.		1	30
Corr.		7	54
h_s	12°	20′	04″
h_o	12°	20.1′	
h_c	12°	34.4′ (p. 252).	

b = 52° (−253) a = 51.8 (p. 253). d = 21° 51.5′. C 73° 51.5′ β = 79.9 (p. 252).

$h_c - h_o$ 14.3′ away on line of bearing, Z = 131.7°.

With latitude 38° in d column find a 38° 30′ corresponding to t 52° 30′.

Then with a 38° 30′ at top of page take out 38° 05′ and 52° 16′, the latitude and hour angle of plotting position, and opposite them note a = 51.8′ and b = 52°, which, combined with declination 21° 51.5′, gives C = 73° 51.5′. Opposite C 73° 51.5′ by interpolation take out h_c = 12° 34.4′ and β = 79.9°, then the difference between the true altitude and h_c is the altitude difference 14.3′ to be laid off from plotting position away from sun on line of bearing, Z = 131.7°.

It will be seen that all this requires no computation, but will be done by the navigator mentally at one opening of the tables when he is ready to plot his position on the chart.

Example 2.—May 23, 1918, during p. m. twilight; sextant altitude of star a Leonis (Regulus) is 66° 18.2′ bearing S. and W.; W. T. obs., $6^h\ 45^m\ 18^s$; C—W, $4^h\ 18^m\ 02^s$; C. C., $-3^m\ 45.5^s$; I. C., 0.0; height of eye, 39 feet; dead reckoning position, latitude 34° 38′ N., longitude 65° 12′ W.

SOLUTION IN DETAIL

	h	m	s					
W. T. obs.	6	45	18W.					
C. W.	4	18	02					
C. C.	—	3	45.5			R. A. M. S.	4	01 09.2
G. M. T.	10	59	34.5			Corr.		1 48.3
R. A. M. S.	4	02	57.5			R. A. M. S.	4	02 57.5
G. S. T.	15	02	32.0					
R. A.	10	04	02.6					
G. H. A.	4	58	29.4					
G. H. A. arc	74°	37′	21″	G. H. A. arc	74°	37′	21″	
Long. W.	65	12		*ta*	9	44		
t_{DR}	9°	25′	21″	Long.a W.	64°	53′	21″	
$a=$	8°			Lat.a N.	34	37	00	
Obs. alt.		66°	18.2′					
Corr.			6.6	Dec.	12°	21.9′	N.	
C. alt.		66°	11.6′	$b=$	35			$a=$ 84.4°
h_c		66	03.4	$C=$	22°	38.1′		$\beta=$ 71.5
h_o-h_c			8.2′	towards on line of bearing, $Z=$				155.9° W.

With latitude 34° 30′ in *d* column at bottom of page find *a* 8° 00′ opposite *t* 9° 30′ (p. 248). Then with *a* 8° 00′ at top of page 212 take out 34° 37′ latitude *h* \ *d* column and 9° 44′ hour angle in *Z* \ *t* column the latitude and hour angle of plotting position, opposite them note $a=84.4$ and $b=35°$; combine *b* with *d* and get *C*, $C=b\sim d=22°\ 38.1'$ and corresponding to this value of *C* find $\beta=71.5$ and $h_c=66°\ 03.4'$, page 213. The difference between this $h_c=66°\ 03.4'$ and the observed $h_o=66°\ 11.6'$ is 8.2′ which lay off towards the star on bearing $Z=a+\beta=$ N. 155.9° W., and draw line of position at right angles to that bearing.

In practical work the navigator will, after obtaining his approximate hour angle and corrected altitude and declination, take his tables and plotting chart, and following down the column headed *a* in the tables he will take out the latitude and hour angle and plot the plotting position, then noting *a*, will run up the *C* column with $b-d$ and note β which he will combine with *a* mentally and draw the line of bearing, then opposite *C* in *h* \ *d* column he will interpolate for h_c, which, compared with his corrected altitude, will give the altitude intercept which he will lay off on the line of bearing and he will then draw the Sumner line or line of position through the point thus obtained at right angles to line of bearing.

If the navigator wishes to report his position immediately after taking his sight, he can assume a watch time of observation and with this compute the hour angle and approximate latitude, and enter the tables and plot his line of bearing on the chart. Then applying the corrections for the observed altitude to the altitude taken from the tables with opposite sign, he is ready to lay off his altitude intercept immediately after taking sight without other calculation than a simple subtraction to get the difference between the observed and computed altitude.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

AN INTERPOLATING INSTRUMENT TO EXPEDITE THE USE OF AQUINO'S TABLES IN NAVIGATION

By LIEUTENANT (J. G.) ALEXANDER FORBES, U. S. N. R. F.

The following is a description of a simple instrument made to facilitate interpolation from mathematical tables. Although the particular instrument which has been made as a sample was designed primarily for the purpose of saving time and calculations in determining line of position by Aquino's method, the principle applies just as well to interpolations in the use of other tables, such as logarithms, etc.; and indeed the sample instrument can, by the addition of one or two spare parts, be adapted to any tables in which interpolation is needed, provided the function be virtually linear.

The particular reason for developing this instrument in its present form and for describing it as an adjunct to navigation is as follows:

Aquino's method has been recommended by Commander G. R. Marvell, U. S. N. (U. S. NAVAL INSTITUTE PROCEEDINGS, March, 1910), who found in it a saving of time, when compared with the Saint-Hilaire method as commonly used, amounting to 3½ minutes; it has also been officially recognized to the extent that the method is explained and the tables are reprinted in H. O. No. 200, "Altitude, Azimuth and Line of Position," published by the Hydrographic Office of the navy. In practicing this method I found in the interpolations a considerable delay which I believed could be largely eliminated by this new contrivance. The additional saving of time, it seemed, might commend the Aquino method as more than ever worth adopting, especially if the present activities of our ships are such that rapid determination of line of position would be of practical value.

On page 190 of H. O. No. 200, the "First Method" of using Aquino's tables is explained; this appears to be the easiest of the three methods to master. The procedure is simple and rapid up

to the point at which the value of a to the nearest 30′ is taken out. The next step is as follows: "Reentering the tables from above with this a and with the given d, by a simple interpolation the corresponding values of b and t are obtained." There are here two distinct interpolations, one for b and one for t, which if carried out completely involve eight separate arithmetical processes—three subtractions, two multiplications, two divisions and one addition—and the writing down of over 50 figures. The use of a slide rule will expedite this work considerably, but there still remain the addition and subtractions. The interpolations could be reduced to their simplest terms and performed mechanically by the use of a simple contrivance based on the principle of similar triangles. A rough sample instrument of brass and wood was therefore constructed in a machine shop with the aid of a milling machine, and the saving of time and mental labor resulting from its use seemed to warrant its further development.

The essential elements of the instrument are: (1) A rigid right-angle triangle; (2) a graduated sliding scale or ruler, free to move right, left, up or down, but always parallel to one side of the triangle, similarly graduated; and (3) a rotating arm made of transparent material pivoted at the point of intersection of the other two sides of the triangle and with a ruled line on its surface passing through the pivotal point. Fig. 1 illustrates the construction. The three sides of the triangle may be designated the base, the fixed scale and the hypotenuse. The triangle is mounted on a board, and raised above its surface high enough to allow space for the moving parts beneath it. Also fastened rigidly to the board is a fixed groove or track, parallel to the base. In this track slides a short bar on which is mounted at right angles another groove or track in which slides the sliding scale. Since the fixed scale is perpendicular to the base, the sliding scale must be parallel to the fixed scale. The sliding scale moves under the triangle, leaving just enough space between for the motion of the transparent rotating arm. The entire length of the fixed scale represents 1° divided into 60′. The sliding scale is twice as long, and bears on its right edge 2° divided into 120′, each of the same length as 1′ on the fixed scale. In this way it is adapted to the conditions obtaining in Aquino's tables. The graduation of the fixed scale is based on the fact that b is given in whole degrees. The graduation of the sliding scale is based on the fact that successive values of d never differ by more than 1°, and those of t

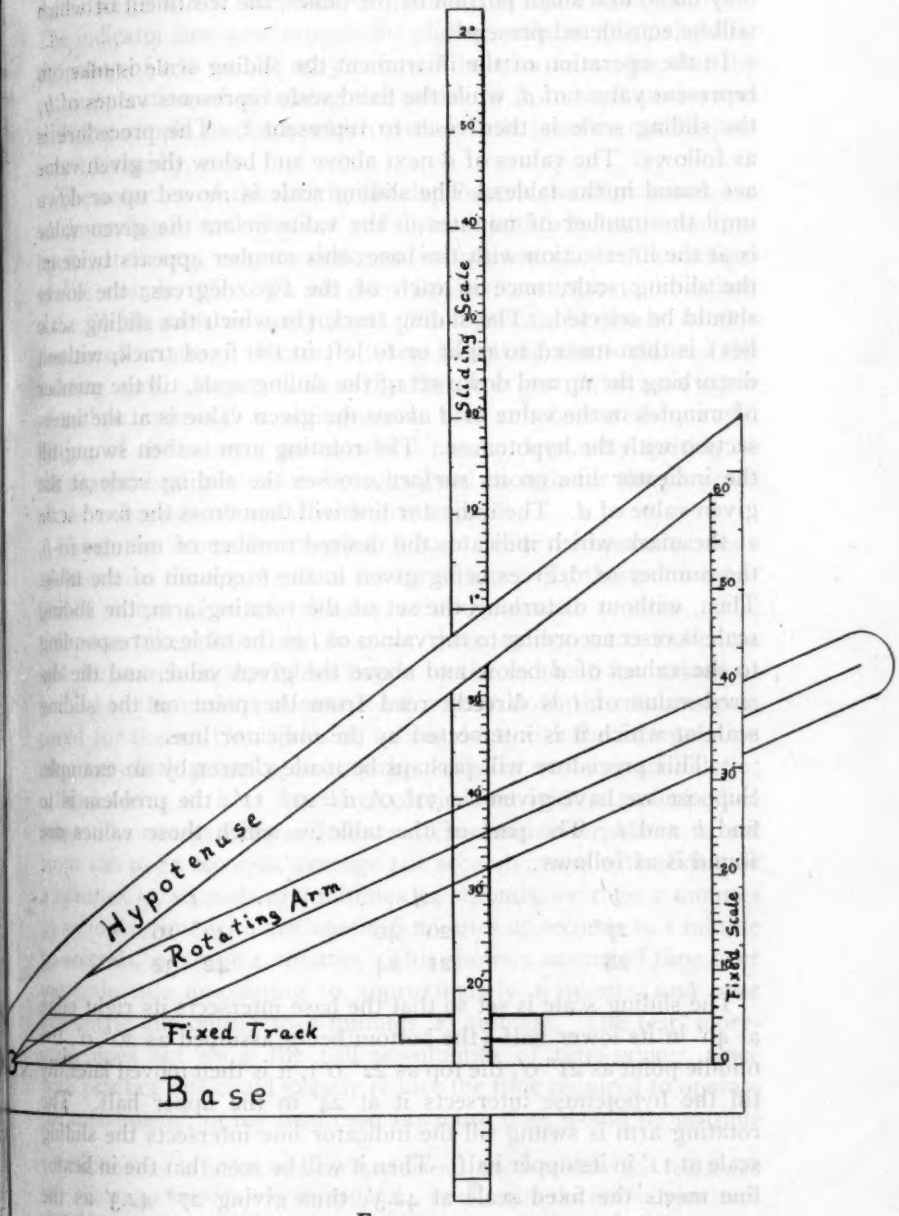
Sliding Scale
Hypotenuse
Rotating Arm
Fixed Track
Base
Fixed Scale

FIG. 1.

only do so in a small portion of the tables, the treatment of which will be considered presently.

In the operation of the instrument the sliding scale is taken to represent values of d, while the fixed scale represents values of b; the sliding scale is then reset to represent t. The procedure is as follows: The values of d next above and below the given value are found in the tables. The sliding scale is moved up or down until the number of minutes in the value *below* the given value is at the intersection with the base; this number appears twice on the sliding scale, once in each of the two degrees; the lower should be selected. The sliding track (in which the sliding scale lies) is then moved to right or to left in the fixed track, without disturbing the up and down set of the sliding scale, till the number of minutes in the value of d *above* the given value is at the intersection with the hypotenuse. The rotating arm is then swung till the indicator line on its surface crosses the sliding scale at the given value of d. The indicator line will then cross the fixed scale at the mark which indicates the desired number of minutes in b, the number of degrees being given in the b column of the table. Then, without disturbing the set of the rotating arm, the sliding scale is reset according to the values of t in the table corresponding to the values of d below and above the given value, and the desired value of t is directly read from the point on the sliding scale at which it is intersected by the indicator line.

This procedure will perhaps be made clearer by an example. Suppose we have given $a=39°\ 0'$, $d=21°\ 11'$; the problem is to find b and t. The part of the table in which these values are found is as follows:

b	d	t
27°	20° 40′	42° 16′
28	21 24	42 32

The sliding scale is set so that the base intersects its right edge at 40′ in its lower half (the bottom being assumed as 20° 0′, the middle point as 21° 0′, the top as 22° 0′), it is then moved laterally till the hypotenuse intersects it at 24′ in the upper half. The rotating arm is swung till the indicator line intersects the sliding scale at 11′ in its upper half. Then it will be seen that the indicator line meets the fixed scale at 42.3′, thus giving 27° 42.3′ as the value of b. The sliding scale is then moved upwards till the base intersects it at 16′, and to the left till the hypotenuse inter-

sects it at 32′ in the same half of the scale (*i. e.*, the same degree). The indicator line now crosses the sliding scale at 27.3′, showing the value of t to be 42° 27.3′. It will be seen from this that the entire operation of obtaining the values of b and t is performed with five simple motions, which with a little practice can be performed rapidly.

The accuracy of the instrument depends on the dimensions, the workmanship in construction, and the care with which it is manipulated. It is very easy to make an instrument of the dimensions of the sample, 7″ x 5″, or even smaller, accurate to less than 0.1′. With such an instrument readings can be made to this degree of accuracy if care is taken in setting the scale and the rotating arm. In practical navigation, however, where an error of 0.2′ or even 0.5′ is unimportant, time can be saved by rapid setting of the moving parts, which can be done very quickly to the nearest half minute, and results good enough for the purposes of the navigator obtained with great speed.

Using the crude instrument, I have made comparative tests to determine the approximate saving of time. To this end a number of values of a and d were written down at random. The time was taken from the moment these values were looked at and the search in the tables begun to the moment the values of b and t to the nearest minute were written down in columns prepared for them. One series of 10 was done with the interpolation after very little practice, and another series of 10 using arithmetic; a third series of four was later carried out with a 10-inch slide rule. The results were as follows: Time with interpolator varied from 120 to 85 seconds, average 101 seconds; time with slide rule 2 minutes 55 seconds to 2 minutes 14 seconds, average 2 minutes 35 seconds; time with arithmetic, 6 minutes 27 seconds to 1 minute 50 seconds,[1] average 4 minutes. This shows a saving of time over the slide rule amounting to approximately 1 minute, and over arithmetic amounting to 2 minutes 20 seconds. The test, moreover, does not show the full possibilities of time-saving, since with practice one could greatly reduce the time required to operate the instrument; in my own case far more than would be possible

[1] The instance in which, without instruments, the procedure was completed in 1 minute 50 seconds was exceptional. In this case the figures were such that the answer was obvious on inspection and no written calculations were required. The next shortest time was 3 minutes 29 seconds.

with either of the other methods. With practice it should be possible to perform with the interpolator the entire operation (*i. e.*, beginning with the search in the table and ending with writing down the desired values) in a minute. I doubt if many could perform the same operation, using a slide rule, in less than 2 minutes, except in those cases in which the figures happen to be such that it can be done readily in the head. In short, it is possible with an instrument not much bigger or more expensive than a slide rule, to increase the saving of time by Aquino's method from $3\frac{1}{2}$ to $4\frac{1}{2}$ minutes.

It was noted above that in a small portion of the tables successive values of t differ by more than 1°, a fact which would make it impossible to use the scale as described in dealing with values in this part of the table. This difficulty is of minor importance as it never occurs when d is less than 45° and only in a minority of combinations when d is more than 45°. The only heavenly bodies used by navigators in the northern hemisphere whose declination exceeds 45° are Capella and four second magnitude stars including Polaris. Thus in the use of the sun, moon and planets this difficulty could not arise, and even in the use of these few stars it could arise only in a minority of observations. But most of this minority can be simply dealt with by engraving on the left-hand side of the sliding rule a different scale with smaller degrees and minutes, so that the space available may comprise more than 1°. For instance, this extra scale could be made to include 6° in its entire length, thus making a span of almost 3° available between the hypotenuse and base with the scale at the extreme right. This would adapt the instrument to declinations up to 71°, which would suffice for all the brighter stars except Polaris, and Polaris is usually treated with a different formula. It would be unwise to make the scale smaller for the sake of the insignificant number of instances in which the difference between successive values of t exceeds 3°, both because the minutes would be too small to read accurately, and because in this part of the table t is no longer a linear function of b.

It was mentioned in the beginning that this instrument could be readily adapted to interpolation with other tables than Aquino's, *e. g.*, logarithms and all the trigonometric functions. To this end there could be marked on the outer edge of that side of the triangle designated the "fixed scale" another scale in which the whole distance was divided into 100 parts instead of 60. To go

with this there could be supplied as many differently graduated sliding scales, to replace that described, as might be needed.

SUMMARY

An instrument is described, based on the principle of similar triangles, with which interpolations from mathematical tables can be performed mechanically with a minimum of labor. A sample has been made, designed especially for the interpolations required in Aquino's method of obtaining line of position. This method has been reported as saving 3½ minutes when compared with the usual method of applying the Saint-Hilaire procedure. It is estimated that with the aid of this instrument at least a minute more could be saved.

DISCUSSION

COMMANDER E. B. FENNER, U. S. Navy.—As an instrument for general use in the interpolation of linear functions Lieutenant Forbes' machine has the serious fault of requiring a number of different scales for use with different tables and the shifting of scales necessary would seem to deprive it of its one claim to value, increased speed.

For use with the Aquino tables this difficulty is practically non-existent and "for those who like that sort of thing, it is doubtless just the sort of thing they would like." Personally, I do not like the Aquino tables and have never been able to find the gain of 3½ minutes in time claimed for them in a single sight, while in working out and plotting a cross of three star sights I have found that the Aquino requirement of plotting a different assumed point for each sight wipes out most of the gained time.

The Aquino method of computation is admittedly somewhat less accurate than the standard Marcq Saint-Hilaire formulæ, the plotting of long altitude differences necessitated by this method introduces further chance of error, and the use of the interpolating instrument seems to result in still another rather small inaccuracy, but the results are claimed to be "good enough."

In the past 10 years a multiplicity of new methods and new gadgets for use in navigation have appeared, practically all of which have involved a possible gain in speed and reduction of labor at the expense of a certain loss in accuracy, and it seems to me that this tendency should be checked. With the present size and value of our fleet units and the unavoidable difficulties of navigation under war conditions no amount of labor is too great if it will, even in slight degree, reduce the danger of catastrophe. If the multitude of odd jobs that have been piled on the shoulders of the navigator make it impossible for him to devote sufficient time to his primary duty, then some one else should take some of the odd jobs. One battleship is too large a factor in our battle strength to make "*good* enough" a proper motto for our navigators so long as "better" is practicable.

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USE OF UNIVERSAL DRAFTING MACHINE FOR PLOTTING DEAD RECKONING

By Lieut. Commander G. M. Baum, U. S. Navy

No doubt every navigator has had the usual race against time to work up his dead reckoning for a noon or near noon sight after a forenoon of maneuvering. The problem which confronts the navigator is the obtaining of an approximate dead reckoning position for an assumed point in the shortest time possible. The universal drafting machine offers a ready and simple solution.

The method described below is probably being used by many navigators, and no claim for originality therein is made. It is believed, however, that officers who may be ordered as navigators in the future may benefit by this description. Furthermore, no claim is made that it is the best method, but the writer has found it the best he has ever used.

First prepare a table giving the distance in miles and tenths of miles run for elapsed time of every minute from 1 up to 60, at speeds ranging from the lowest to the highest maneuvering speed of the ship. Paste this on a board or piece of cardboard for convenience.

The scales furnished to ships with the universal drafting machine are graduated on one edge in inches and tenths of inches, and on the other edge in inches and one-sixteenths of inches. For convenience, assume the scale to be one inch equals one mile. Use the scale graduated in inches and tenths of inches.

Have the quartermaster on watch keep an accurate record of all changes of course and speed, no matter how slight the change of course or short the time, in a loose-leaf notebook. The advantage of having a loose-leaf notebook lies in the fact that one or more leaves may be detached and sent to the navigator in the chart-house, and the record resumed on a new page, without breaking the continuity of the record.

Take an arbitrary point anywhere on the chart or plotting sheet, whichever is being used, off to one side and clear of the work, to represent the last plotted position or starting point. From this point lay down the distances run on the various courses, using the scale of the universal drafting machine. The scale is naturally larger than that of the chart or plotting sheet, but you are working with the scale of one inch equals one mile on the scale, and therefore must temporarily disregard the scale of the chart. No matter how short the distance run may be, the large scale enables its being plotted. Having plotted the track of the ship from the data in the notebook, lay the edge of the scale to cut the initial point and the point of the last plot. This gives the course made good. The distance between the two points is the distance made good, which can be readily read off in miles. Clamp the scale and move it to your last dead reckoning position and lay off the course made good. With dividers step off the distance made good, first converting the distance run, to the scale of the chart or plotting sheet in use.

The method outlined above does not take into account the advance and transfer on a turn, but these are comparatively so small that they may be disregarded.

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SECRETARY'S NOTES

Lack of Material

Due to the limited number of essays and articles received for publication, it has been necessary to shorten that part of the PROCEEDINGS devoted to original subject matter.

Prize Essays 1919

The attention of all the members and the subscribers to the U. S. NAVAL INSTITUTE PROCEEDINGS is invited to the new rules governing the Prize Essay contest for 1919 under the heading of Special Notice in this number. It is requested that authors who are writing or who contemplate writing essays submit them at their earliest convenience, as the Institute is in pressing need of articles for publiction in the PROCEEDINGS.

Topics for Essays

The board of control invited the Chief of Naval Operations, Commanders-in-Chief of the U. S. fleets, Chiefs of Bureaus, Presidents of the U. S. Naval Institute and Naval War College, and the Superintendent of the U. S. Naval Academy to suggest topics for essays. The suggested topics received to date will be found opposite the Special Notice, and the list will be added to as the suggestions are received.

Membership

Since March 36 regular members, 2 associate members and 1 life member have joined the Institute. Total membership 4901.

Deaths:

Rear Admiral J. D. Ford, U. S. N., retired.

Civil Engineer C. A. Bostrom, U. S. N.

Resignations: One.

Address of Members

Several hundred copies of the PROCEEDINGS have been returned, because of the lack of proper address, *all members are urged to keep the Secretary and Treasurer informed of the address to which* PROCEEDINGS *are to be sent, and thus insure their receipt.*

This precaution is now of particular importance as notices of changes of stations are not now available for the use of the Institute's staff.

Members and subscribers are urged to notify the Secretary and Treasurer promptly of the non-receipt of PROCEEDINGS, in order that tracers may be started. The issue is completed by the 10th of each month.

Dues

It is requested that members who have not paid their 1918 dues of $2.50, do so at their earliest convenience.

Book Announcements

Due to freight embargoes, scarcity of paper and binding cloth and the drafting of many of the printers' experienced employees, the Institute is experiencing difficulty in supplying the demands for books published by the Institute. Every effort to fill the orders of members and subscribers is being made and will continue to be made. In cases where books are out of stock but are expected within 10 days time the orders are placed on file, otherwise the money is refunded.

Due to a delay in receiving the approved manuscript for the Landing Force Manual U. S. Navy 1917, the Manual will not be ready for issue until about August 1, 1918.

The Naval Artificer's Manual has been revised and will be ready for issue about June 15, 1918.

The revision of the "School of the Ship" has been delayed indefinitely.

Discount on Books

The five per cent additional discount allowed to purchasers of books whose accounts during a calendar month amounted to a hundred dollars or over has been discontinued.

Book Department

The Institute Book Department will supply any obtainable book, of any kind, at retail price, postage prepaid. The trouble saved the purchaser through having one source of supply for all books, should be considered. The cost will not be greater and sometimes less than when obtained from dealers.

Reprints of Articles

The attention of authors of articles is called to the fact that the cost to them of reprints other than the usual number furnished, can be greatly reduced if the reprints are struck off while the article is in press. They are requested to notify the Secretary and Treasurer of the number of reprints desired when the article is submitted. Twenty copies of reprints are furnished authors free of charge.

Illustrations

Authors of articles submitted are urged to furnish with their manuscript any illustrations they may have in their possession for such articles. The Institute will gladly co-operate in obtaining such illustrations as may be suggested by authors.

Original photographs of objects and events which may be of interest to our readers are also desired, and members who have opportunities to obtain such photographs are requested to secure them for the Institute.

Suggestions Invited

Members are invited to send to the Secretary comments, suggestions or criticisms on the make up of the PROCEEDINGS, and to submit topics for essays.

Notice

Whole Nos. 145, 146, 147, 149, 155 and 166 of the PROCEEDINGS (March, 1913, June, 1913, September, 1913, January-February, 1914, January-February, 1915, and November-December, 1916) are exhausted; there are so many calls for single copies of these numbers that the Institute offers to pay for copies thereof returned in good condition at the rate of 25 cents per copy.

ANNAPOLIS, MD., May 8, 1918.

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Through the courtesy of *Sea Power*.

PROFESSIONAL NOTES

PREPARED BY

LIEUTENANT WM. B. JUPP, U. S. Navy

GENERAL ARRANGEMENT

VESSELS BUILDING.
CHARACTERISTICS OF NAVAL VESSELS AND AIRCRAFT.
NAVAL POLICY.
PERSONNEL.
MERCHANT MARINE.

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CHILE

TO RELEASE HUN SHIPS FROM CHILEAN PORTS.—The agreement which has been pending with Germany for the release of three of the German merchantmen which have been laid up in Chilean ports during the war has been completed. Germany has stipulated that the vessels must be used to carry cargoes only to neutral ports. Metals, saltpeter and other products will be exported.—*Star*, 5/3.

CHINA

CHINA TO SEND 40,000 TO FRANCE BY SUMMER.—Capt. Ting Chia Chen, military counselor to the President of China and also to the Chinese minister of war, has arrived here on a French steamship. He said that China now sending troops to France to fight for the Allies.

Captain Ting, who is a graduate of the United States Military Academy at West Point, for some time has been in Europe as a military observer in the war theater for his government.

"China is preparing to do her part in making the world safe for democracy," he said to-night.

"It is true that China has troops now on the way to the battle front, and it is the calculation of the Peking Government to have no fewer than 40,000 fighting men with the French by early summer. I have just left France, and there remained behind me ten other Chinese officers, whose duty it will be to select training camps in France for Chinese troops."

The captain added that there is a spirit among the Chinese people that Prussianism must be suppressed for the good of mankind and the advance of civilization.—*Ev. Star*, 30/4.

Through the courtesy of *Sea Power*.

GERMANY

GERMANY BUILDS MINE-LAYING CRUISERS.—New mine-laying cruisers of 4000 tons displacement and a speed of 35 knots are among the recent additions to the German Navy according to reports. The figures given out are believed to be exaggerations, since a supply of 480 mines is said to be carried, each weighing close to a ton, and four 5.9- and eight 4.1-inch guns are also said to be the armament.

Sixty destroyers, it is declared, have been launched since the war was declared. Their speed is 34 knots and their armament is increased to three 4.1-inch guns and six torpedo tubes. Indications are that the German building program has made the navy stronger in every class save that of light cruisers than it was when war was declared.—*Naval Monthly*, May.

HEAR GERMANY HAS SIX SUPER-SUBMARINES.—Information received in an official quarter in Washington credits Germany with having completed the construction of six super-submarines of 1500 to 1800 tons capacity, with a cruising radius of 10,000 miles, and that six more U-boats of the same design are being rushed toward completion.

Germany has designed the newer submarines, it was said, to be superior to destroyers. It was said that the allied Admiralties have known for more than three months of the actual construction of these super-submarines, which, it is believed, follow on general lines the construction of the commercial U-boats, one of which, the *Deutschland*, visited the United States.—*N. Y. Herald*, 28/4.

GERMAN SUBMARINE WARFARE EXTENDED.—The Swedish Minister at Berlin has announced that Germany will sink all neutral ships, regardless of the flag they fly, if the country to which they belong has made a tonnage agreement with the Allies, or if the major part of the cargo is destined for an allied country.

Dutch, Norwegian, Swedish, Danish and Spanish ships are likely to be affected by this new decision. It will probably increase the number of total sinkings, but it is not thought that it will raise the amount of lost tonnage materially. Holland, Sweden and Denmark have been shipping little stuff in neutral bottoms to allied countries in many months. Norway and Spain, however, have been carrying on a considerable business.—*Nautical Gazette*, 11/5.

TEUTON COMMANDERS AT ZEEBRUGGE AND OSTEND DECORATED.—"In connection with the splendidly carried out defence against the British attempt to blockade Zeebrugge and Ostend and land at those ports," says the *Berlin Vossische Zeitung* in its edition last Sunday, "a shower of orders has rained upon various persons. Commanding Admiral Schroeder has been decorated with the Swords of the Red Eagle of the First Class; Chief Berlet, of the General Staff of Marines, has been awarded the Red Eagle of the Second Class, with Swords, and Captain Schuette, commander of the batteries on the mole, with the Knight's Cross of the Royal Order of Hohenzollern, with Swords."

The newspaper says the Germans lost only eight killed and sixteen wounded in the fighting.

According to the *Amsterdam Telegraaf*, the German casualties were 300, of which 70 were killed or died of their wounds.—*N. Y. Herald*, 7/5.

GERMANY PLANS SEA RAID.—Germany is preparing for a vast sea raid supplementing her west front drive, according to information gathered officially by the navy.

While not verified, the reports were that unwonted activity is evident at the Teuton naval bases, and that all movements tended to show preparations for an offensive ahead of any allied smash.

The navy advices, similar in many respects to press messages out of Berne, may be German-inspired with a view to disturbing American-Allied morale. But, whether they are only German propaganda or not, they were regarded sufficiently plausible by navy authorities to take seriously and to prepare against such a drive.—*Naval Monthly*, May.

SAYS ALL REICHSTAG BACKS U-BOAT WAR.—Speaking during the naval estimates debate in the Reichstag Committee, Count von Westarp, the conservative leader, says a Berlin despatch, declared that with the exception of the independent socialists the committee was unanimous that the unrestricted submarine warfare must be continued by all means and in the sharpest manner.

They were agreed likewise, said the speaker, that the building of U-boats must be continued to the utmost possible limit, regardless of the duration of the war. This program must be followed out, because it was regarded as a means of attaining peace and making England submissive.—*N. Y. Herald*, 20/4.

SEIZING NEUTRAL SHIPS PRECEDENT SET BY GERMANY.—Vice Admiral von Capelle's attack on the United States and the Allies before the main Reichstag Committee, for what he called "the robbery of Dutch tonnage," caused State Department officials to call attention to-day to the fact that Prince Bismarck justified the action by Prussian troops in 1870 in seizing and sinking six neutral British vessels in the River Seine near Rouen.

Bismarck, in a note to Count Bernstorff, German Minister to London, under date of January 25, 1871, said:

"The case was one of necessity, which, even in time of peace, may render the employment or destruction of foreign property admissible, under reservation of indemnification. I take the opportunity of calling to mind that a similar right in time of war has become a peculiar institute, the Jus Angariae, which so high an authority as Sir Robert Phillmore defines thus:

"'That a belligerent power demands and makes use of foreign ships, even such as are not in inland waters, but in ports and roadsteads within its jurisdiction and even compels the crews to transport troops, ammunition and implements of warfare.'"

Ship construction in this country has exceeded many fold American losses by submarines since the United States entered the war, Shipping Board officials said to-day in discussing the statement of Von Capelle.

It was emphasized that he made no such claim with respect to American shipping, which has suffered the loss of only three or four vessels since war was declared. Sinkings of American ships were more frequent when the United States was neutral and the ships went unarmed against attack. It was said to-day that no more than 40 merchant ships flying the American flag had been lost from all causes since the war began, nearly four years ago.—*N. Y. Herald*, 20/4.

BELIEVE GERMANY HAS STOCKS OF VANADIUM.—An analysis of fragments of shells flung by the German long-range guns into Paris, showing that the walls of the projectiles contained a considerable quantity of vanadium, has aroused speculation among steelmakers as to the German source of this important alloy. Moderate amounts of the metal are produced in Sweden from ores found there, but it had been supposed that importations from this source had been used by the Germans in building their submarines and other war engines requiring steel of the particular quality obtained by the use of vanadium as an alloy. It is estimated that the American Vanadium Company, through its mines in Peru, supplied more

than three-quarters of the metal which reached the world's markets before the war, and none of this is known to have reached Germany on direct shipments from the time when the allied navies began their rigid search for contraband on Europe-bound vessels.

The theory of steel men is that, in preparing for the war, Germany laid in large stocks of the alloy. In course of a discussion of the shells from the Teuton big gun, Joseph de Wyckoff, foreign sales manager of the American Vanadium Company, recalled that fully a year and a half before the outbreak of hostilities the Krupp management hinted that substantial amounts of vanadium were held in the company's storehouses.

The phase of the situation which interests the steel trade particularly is the ability of the German shellmakers to make use of this precious alloy for a special and not altogether effective purpose after nearly four years of war. Either the accumulated stock was much greater than was believed in 1914, or imports by secret channels have kept the supply abreast of the heavy demand. After the submarine *Deutschland* left this side on her second trip it was rumored that a large consignment of vanadium was aboard, and that in both trips the undersea cargo carrier took back 25,000 pounds of the metal. None of this had its source in the American Vanadium Company's mines, officers of the company state, and presumably was supplied from a store accumulated by German agents here.—*N. Y. Herald*, 3/5.

BOCHES PAVE WAY FOR ATTACK ON AMERICAN HOSPITAL SHIPS.—The German wireless, which recently sent out a despatch alleging that American aviators were crossing to Europe by hospital ships, reiterates the charges in a longer despatch. The reason for the emphasis placed on this false charge by the Germans, it is stated here, is probably that they are laying the foundation for justification at a later date of the torpedoing of the American hospital ships in case any such ships are put in the transatlantic service to carry home invalided soldiers. It may be recalled that similar charges were spread broadcast about British hospital ships, as a prelude to torpedoing them. The German wireless message says:

"American aviators are crossing to Europe as members of the Red Cross on hospital ships. This misuse of the Red Cross appears from documentary evidence found on American aviators who have been shot down. An American brought down in the region of the army of General Von Hutier carried a pass which referred to him as a member of the American Ambulance Service for France.

"Prisoners openly admit that it is the general practice for aviators to enter the American Ambulance Service for their passage to Europe and to cross on hospital ships. After they are landed in France they immediately transfer to the automobile corps and thence into the air service.

"The captured aviator referred to had, however, transferred directly from the ambulance service into the air service. Another carried a certificate in which the dates of several transfers were officially indicated."

[The British Admiralty already has denied the charge that American aviators were crossing on hospital ships, saying: "No hospital ship, British or American, has ever carried anybody but invalids and the necessary medical staff. The American naval authorities state that they have some few aviators who were in the Allied Ambulance Service in France before the United States came into the war, but even in such cases these men crossed the Atlantic in ordinary ships, taking their full chance of being torpedoed."]—*N. Y. Herald*, 3/5.

GREAT BRITAIN

BRITAIN MAY AUCTION HIGH PRICED SHIPS.—The London correspondent of the *Daily Post* says a suggestion of interest to ship owners is being made with regard to standard ships built and registered in the name of the Ship-

ping Controller and ships which have been bought at high prices for the Shipping Controller from other countries, notably the United States and Japan.

The ships eventually will be sold when the government goes out of the ship owning business, and it is suggested the vessels be put up at auction now and pass into the ownership of private firms, being treated exactly in the same way as ships requisitioned for the period of the war, which are used by the government, but remain the property of their original owners.—*N. Y. Herald*, 27/4.

SHIP LOSS REPORT MONTHLY.—*British Decide to Abandon the Weekly Bulletin.*—The Admiralty has announced the cessation of the weekly return of shipping losses and the substitution of a monthly report on the Thursday following the 21st of each month.

A table issued gives the losses of British, allied and neutral tonnage due to enemy action and marine risk since the beginning of 1917. The losses for the quarter ending in March, 1917, were: British, 911,840, and allied and neutral, 1,619,373. For the quarter ending in June: British, 1,361,370, and allied and neutral 2,236,934. For the quarter ending in September: British, 952,938, and allied and neutral, 1,494,473. For the quarter ending in December: British, 782,880, and allied and neutral, 1,272,843.—*Baltimore Sun*, 25/4.

HOLLAND

HOLLAND'S QUARREL WITH GERMANY.—Whether Holland is to be added to the list of nations at war is one of the big questions to-day. If she does come in, there appears to be no doubt that it will be on the side of the Allies. The reasons Germany is putting forth for her aggressive stand against this little country can be boiled down to the Dutch ship situation, now in a great measure controlled by the United States, and her need to use Dutch territory and Dutch waterways for the shipment of munitions and material to build up the intrenchments and embankments in Belgium. The second reason resolves itself into the sand and gravel controversy between Holland and Germany and between Holland and England. This dispute began in 1915, when it first came to the notice of the British Government that Holland was allowing Germany to ship military supplies through her country, thus violating the laws of neutral governments. In October, 1917, the British Government called Holland to task for allowing her waterways to be used by the Germans for the shipment of copper, sand and gravel used in building military posts and roads.

"The German Government have been and are being allowed to transport supplies required in connection with their military operations from their own territory to territory in German occupation, and *vice versa* across the territory of a state taking no part in the war," wrote Mr. Balfour. "The intention and result is materially to relieve the strain upon the railways and waterways of the belligerent country essential to its military operations. What is taking place constitutes a breach of the obligations incumbent upon a neutral state.

"If Germany finds it necessary for her own purposes to send commodities containing copper to Belgium to be smelted in order to extract the metal, and then to return the metal from Belgium to her own territory for use in her munition factories, the carriage of these supplies backward and forward, if permitted, via neutral territory, affords relief to the direct military transport system between Belgium and Germany and constitutes the use by Germany of Netherlands territory for military purposes. For the Netherlands Government to permit this to fail in the observance of their duties as a neutral.

"With regard to sand and gravel, it is immaterial whether the German purposes are alleged to be civil or alleged to be military. Germany is in occupation of Belgium merely in pursuit of military objects, and there can

be no purpose to which the sand and gravel so dispatched via the Dutch waterways can be put which does not constitute a use of those waterways for the forwarding by the enemy of supplies which are required in connection with the war.

"The sand and gravel which have been allowed to pass is far in excess of anything which is required for civilian purposes in Belgium. There is also the local output to be taken into account. Belgian quarries can easily produce all that is required for non-military purposes in that country. Since it is understood that the Belgian quarries are worked by prisoners of war, the output is doubtless used for civilian purposes. Were it not so it would be a breach of the Land War Regulations, since it would be a case of employing the labor of prisoners on work connected with military operations.

"His Majesty's Government feel no doubt that the Netherlands Government are allowing use to be made of Dutch territory by the Germans for the purpose of forwarding to Belgium in enormous quantities supplies which have intimate connection with the military defences of the German forces on the western front, and they certainly are not disposed to acquiesce in any arguments to the effect that the Netherlands Government are bound to allow the traffic either under the Rhine Convention or under any principle of international law or public right. On the contrary, they maintain that the Netherlands Government are bound to put an end forthwith to this transit traffic of the sand and gravel equally with that of the metals."

It seems that even as early as 1915 Great Britain had remonstrated on just these points, and in July, 1916, the Netherlands Government informed the British that it would limit the transit of sand and gravel to Belgium to 75,000 tons a month, all of which was to go for pacific purposes. Later this was increased to 450,000 tons a month. Officers were sent to Belgium to see how much of this material was being used for military purposes and how much for civil, but could make no calculation on account of being forbidden by the Germans to enter into military territory.

"When the matter was first raised in 1915 and 1916," Mr. Balfour continued, "the Netherlands Government felt great doubts as to the use of the sand and gravel transited across Holland. They thought it right to ask the German Government to be furnished with certificates as to the employment of the sand and gravel, and the German Government readily furnished them with 'scraps of paper' certifying that this sand and gravel was used for civilian purposes only. The Netherlands Government came to realize that it would not be right to attach very great importance to these certificates, and it was in spite of them that they decided in the summer of 1916 to restrict the transit of sand and gravel to 75,000 tons a month. It is true that the Netherlands Government subsequently altered their mind on the point, and after hesitation and obvious misgivings decided to continue to accept the certificates.

"Since the German occupation the fact is there has been little or no pacific use of Belgian roads, railways, or quays. Then there are the quantities of sand transited into Belgium, vastly in excess of any possible civilian requirements. Then there is the proof that such civilian requirements, if they exist, could be and almost certainly have been supplied from sources in Belgium itself. Next there is the certain knowledge that the German demands for these supplies for direct military objects, such as fortifications, is enormous, and there is the evidence that the concrete used for such fortifications is derived from material which comes from Germany—comes, that is, from the source from which the transited gravel comes, and not from Belgian quarries. And, finally, there is the direct sworn evidence that certain loads of sand and gravel, which had been transited, were, in fact, used for military objects."

Holland in due time took up this matter with Germany, and several weeks ago it was reported that Berlin and The Hague had come to an agreement on the question of the use of waterways. It was understood

that Germany had agreed to ship only as much building material as was necessary for civilian purposes. Now, however, it appears from the cable dispatches that Germany is considering the agreement as merely one of the many "scraps of paper" she has from time to time issued, and that she expects to take what she wants by the power of the mailed fist.

Holland has had due cause for war before this. Three weeks after America had entered the war the toll of American ships sunk by German submarines was 20, aggregating a tonnage of about 59,000. Up to the same date, neutral Holland, Germany's peaceful little neighbor, had lost 76 ships, amounting to about 150,000 tons, as well as a great number of lives. Yet Holland, with the fear, perhaps, of the fate of Serbia, Belgium and Rumania, did nothing. At the time of the sinking of her ships, Germany offered her not so much as an apology, but promised merely to compensate her at the close of the war.

Germany was not satisfied even with this attempt to cripple the industries and break the spirit of Holland. Many of the strikes and insurrections in the Dutch Indies have been traced to German intrigue.

Apparently the only reason Germany has respected the territorial integrity of the Netherlands up to the present time is that Holland has been extremely useful to her. Great quantities of sugar, coffee, cocoa, fish, butter, eggs, beef, cheese and even wheat have been shipped by the Dutch to Germany. Even when Holland was virtually starving and living on a close-ration basis, food was being smuggled into Germany. Much profiteering was going on openly in the little country. The German Government established a central buying office in The Hague and offered prices far above those that the Dutch people could pay. The Dutch Government could not, or did not, protest. There were riotings and strikes in the cities of the Netherlands. The reason given by the Dutch authorities for this state of affairs was that Holland had to send food to Germany or else freeze. Germany has been the only source of supply of coal to the Netherlands. The question whether Holland could have got fuel from the Allies is one widely discussed.

Another reason given for Germany's so-called respect of Dutch territory up to date is that Holland is useful to her as a neutral nation, in that she serves as a highly efficient and quiet flank cover on the north of German warfare in Belgium. By keeping up amiable relations with Holland, the Germans have had no need of protecting their lines of communication through Belgium to Flanders and France, except with border police and electric entanglements. Germany also has appreciated, perhaps, that Holland at war would be of benefit to the Allies, but it now seems that this consideration is no longer of great weight with the Teutons.—*N. Y. Times*, 28/4.

WHY GERMANY HESITATES TO MAKE A BELGIUM OF HOLLAND.—It has been asserted by Dutch officials in this country that Holland was fully aware that had Germany made war against France and England as a result of the Agadis crisis in the summer of 1911, not only Belgium, but also Holland, would have been invaded. There are said to be plans in the possession of the German General Staff for an attack upon England from the Dutch coast.

That the plan of 1911 was not executed in 1914 is said to be due to the fact that the German military strategists gave way to their colleagues, the tacticians, who pointed out that not only could no excuse be found for attacking Holland, but that the latter had really served Germany in making large concessions to the Vulkan company in June, 1914, for an extensive plant at Vlaardingen, near Rotterdam (only 115 miles from Harwich), and that in a political and commercial sense, as well as in a military one, it would be well to keep Holland as a neutral barrier until such a time as the new Vulkan yards at Vlaardingen could be availed of.

Germany has all along believed that the Dutch would be too much occupied with feeding the German armies and supplying German armaments to think of opposing by arms their best customer. From the very beginning of the war, however, the press of Holland, as well as the government itself, in a long series of diplomatic exchanges, has taught Germany otherwise.

The war caused a great dislocation of Dutch industries and an extra expense to the government, which up to June, 1917, had averaged $35,000,000 a year.

To several interpellations made in the chamber as to whether the Dutch Army was adequately prepared, the General Headquarters issued a memorandum.

"Though it is inadvisable to make public information which might benefit a possible future enemy, there is no objection to furnishing data which will convince Dutch soldiers that they can face the prospect of war with confidence."

If their country were attacked from Germany, engineers who know Holland and its history, say there is no doubt that the Dutch would open the dykes and flood certain tracks which lie below sea level in order to secure protection of North Holland.

There are two main lines of inundation. The advanced positions toward Germany is known as the Grebbe line, and extends from the Waal, across the Rijn, through Amersfoort to the Zuider Zee.

The other, and by far the more important, line runs from Muiden, on the Zuider Zee, through Utrecht and Kuilenburg, to Gorkum, on the Maas. All this tract of country can be flooded by sections, and when the waters were spread over the face of the land a chain of forts, gristling with guns, would be left sticking out like islands to repel the invaders.

In that case the whole of the North of Holland would be turned into a vast island from the Maas to the forts of the Helder, at the narrow entrance to the Zuider Zee, if necessity arose, great stretches of this island could also be flooded by breaking down the seaward dykes to which Holland owes her very existence. The sacrifice would be great, but the Dutch press has recently been saying: "Liever bedorven dan verloren land"—Better a drowned land than a lost one.—*Baltimore Evening Sun*, 25/4.

DUTCH PRESS SNEERS MAY CAUSE AMERICA TO DROP GRAIN OFFER.—The United States is prepared to withdraw its recent offer of three ships to expedite grain to Holland, if the comment of Dutch newspapers, accusing the United States of duplicity in the condition that equal tonnage should leave Dutch harbors for America, is to be taken as indicative of the feeling of the Netherlands Government and people.

Officials expressed disappointment and surprise at the reception accorded to the offer of the United States, which based on a proposal of the Dutch Government to alleviate suffering from a shortage of breadstuffs. The offer was supplementary to President Wilson's statement of March 20, when the Dutch ships were requisitioned, that 100,000 tons of grain would be provided for Holland if ships were sent to carry it.

If Holland does not desire to take advantage of the offer to expedite the grain, the original offer to furnish grain still holds, but the time consumed in sending ships from Holland to America will delay the relief the United States is ready to grant.

Typical of the Dutch comment is an editorial in the *New Rotterdam Courant*, received by cable, as follows:

"In the last few days an official American communication has been received to the effect that three vessels, over two of which the American Government has no jurisdiction, will be allowed ultimately to leave for Holland on condition of the leaving of vessels of equal tonnage from Holland to an American port. This apparently friendly concession may

really be tightening of the noose, if, as has been suggested, it is an attempt to make Holland purchase three cargoes of grain with three conveyors. This would be a perfidious offer about which disappointment could not be too strongly expressed.

"We have not a high opinion of American good faith, but that official duplicity could go so far on promises made in black and white by the President of the United States, openly repudiated, it is impossible to believe. Such shamelessness has not been exceeded in this war. The American Government must give unambiguous guarantee that the President's promises of March 20 will be respected."

The condition that equal tonnage should leave Dutch waters for America when the grain steamship left was imposed to prevent an increase in the size of the fleet tied up in Dutch ports by the German submarine menace.—*N. Y. Herald*, 25/4.

RUSSIA

MUNITIONS AT KOLA SOUGHT BY GERMANS.—Germany is striving to get a big, fresh store of munitions piled up by the Russians at the port of Kola, according to War Department information. This is behind the offensive raging in Finland, a battle dwarfed by the west-front struggle, but still important from the fact that Germany has been forced to send more troops into Finland.

Three or four divisions have been thrown into Finland in recent days and other reinforcements had to be sent there previously. This is little compared to the numbers on the west front, but at the present stage one fresh division in the west could relieve three or four jaded divisions.

The Finnish map shows a "nutcracker" problem. To the north of Tammerfors are the White Guards, friendly to and aiding Germany. In the south the Germans came in from the Aland Islands, Hango and Lovisa. They now hold Helsingfors and Abo. Between the White Guards and the Germans are the Red Guards, Finnish Bolsheviki. Fighting gallantly, they have staved off the Whites and the Germans thus far, but the "nutcracker" is closing on them.

The War Department's information is that Germany intends to place one of the Kaiser's sons over Finland and that the Teutons intend to sweep across to the railroad which runs from Petrograd to Kola, and all-the-year warm water port, where vast Russian supplies were landed.

British marines recently landed there. They are intended to guard the munitions there just as the Japanese and British are keeping a watchful eye on supplies at Vladivostok, Siberia.

Army men praise the Red Guards' gallant defence and take some comfort from the fact that Germany is forced to send troops to Finland instead of drawing on that locality to reinforce the west front.—*Baltimore Evening Sun*, 19/4.

NO SIBERIAN CAMPAIGN NOW.—Those in Japan who favor Japanese intervention in Siberia found no encouragement in the words of Viscount Yasuya Uchida, former Ambassador at Washington, who, on his return here from his post as Ambassador to Russia, expressed doubt as to the wisdom of entering Siberia at this time. His conviction was that Bolshevism to-day represents the thought of a great majority of the Russian people.

The addresses of Count Terauchi, the Prime Minister, and Viscount Motono, the Foreign Minister, before the Diet recently are interpreted as indicating that Japan will for the present send no army into Siberia. Although nothing has been announced officially, the impression prevails that Japan has been influenced considerably by the attitude of the United States, which was that of doubting the practicability of Japanese intervention.

The Japanese campaign in Russia doubtlessly would depend on assistance from the United States as to war material, including munitions and air-

planes, and perhaps money. It is believed that Japan would hesitate to begin a war on Russian soil without the support of the United States, and that is why armed intervention is considered very doubtful at present. Should the situation change for the worse, the government will call a special session of the Diet to consider the matter. Meantime, the necessary military preparations are being advanced.—*Baltimore Sun*, 20/4.

ONE HUNDRED THOUSAND TEUTONIC CAPTIVES FOMENT SIBERIAN REVOLT.—German and Austrian war prisoners in Siberia are estimated at more than 100,000, and in official circles here it is held they constitute a grave menace to the allied position in the Far East. While the number of released prisoners bearing arms under the Bolshevik flag is not great, even a small number might prove a potent danger if permitted to become the organizing and directing force behind the Bolsheviki.

With German organization controlling the Bolsheviki, a huge army might be raised in Siberia. It is held here that such a force might necessitate the sending of a large Allies army to this theater.

Previous to the rise of the Bolsheviki to power and their subsequent peace negotiations with Germany, the Allies paid very little attention to Siberia. Since then little has been done to counteract enemy propaganda or German attempts to obtain control of the vast riches of Siberia when the war is brought to a close.

The greater number of the 100,000 prisoners are in Irkutsk and other large towns to the west, but in Priamuria—that part of Siberia which abuts on Manchuria and which has an outlet to the China Sea—there are between 15,000 and 16,000. These are in encampments at Habarovsk, Blagovestschensk, Nicholsk and other centers. The proportion of prisoners is three to one in favor of the Austrians. Five thousand of the prisoners in Priamuria are officers, most of them being in the camps at Habarovsk.

It is known that in Irkutsk and Western Siberia the Germans, especially the officers, are working with the Bolsheviki. Some released prisoners also are with the Bolshevik forces now fighting against General Semenoff, the anti-Bolshevik leader in Eastern Siberia.

Those who have visited the prison camps say the officers and men keep themselves in excellent physical condition, believing a day is coming when their services will be needed in the Far East, and that a German force will come to their assistance over the Siberian Railway.

General Semenoff is holding an important part of the Siberian Railway between Vladivostok and Irkutsk. His force, however, is small and his supply of arms and ammunition limited. Should the Germans and Bolsheviki work in unity they may break Semenoff's hold on the railroad.

Allied sympathizers here declare that the only way to prevent the Austro-German prisoners from doing further damage is to support any movement that would enable the Allies to obtain control of the prison camps, or, better still, to have the prisoners removed to a safer locality.

A large number of escaped prisoners have come from Siberia into China and Mongolia by using passports purchased from the Bolshevik authorities. Some of these have been at work among the large Mohammedan population of the Chinese province of Sinkiang, while in Mongolia Bolshevik and Turkish agents have been attempting to bring about an uprising against the government.—*N. Y. Herald*, 26/4.

KORNILOFF TROOPS FIGHT BOLSHEVIKI.—Hostilities have been renewed between the troops of General Korniloff and those of the Soviets. Rostof-on-Don is in the hands of the anarchists. At Kherson, after the Germans left, massacres of officers and bourgeoisie by soldiers occurred. The Germans since have reoccupied the town.

Criminals at Novo-Tcherkask, who began to indulge in excesses, were dispersed by machine guns. The Turkish cruiser *Hamidies* and two torpedo-boats are reported to have arrived at Odessa. There was severe fighting between the White Guards and Red Guards north of Viborg.—*N. Y. Herald*, 22/4.

REFUSE TO FIGHT ALLIES.—The Germans are steadily withdrawing troops and sending them to France.

Polish citizens refused to enlist in a proposed Polish corps to fight against the Allies in Flanders.—*Baltimore Evening Sun*, 26/4.

SWEDEN

ONE HUNDRED AND SEVENTY-SIX SWEDISH SHIPS LOST.—One hundred and seventy-six Swedish ships, with a gross tonnage of 175,000, have been destroyed in the course of the war. For the most part they were sunk by German submarines. One hundred and twenty-one were steamships. Generally the Germans were reluctant to sacrifice costly torpedoes on small prey. The biggest ship loss was the *Fridland*, of 5000 tons. Through the destruction of these ships 224 Swedes were killed and drowned, in addition to other nationalities among the crews.—*N. Y. Herald*, 11/5.

UNITED STATES

SHIPS AUTHORIZED.—Six new authorized United States battleships are designed to be of 41,500 tons, the largest battleships in the world.—*Official Bulletin*, 30/4.

TWO 1000-FOOT DOCKS FOR NORFOLK.—The original plan of the Navy Department for the construction of new docks of the largest capacity called for two such docks at Philadelphia and one at Norfolk. This plan has been changed and one is to be built at Philadelphia and two at Norfolk. According to Rear Admiral McLean, commanding the Fifth Naval District, one of the docks now under construction will be ready next fall. Their length will be such that any ship which can pass through the Panama Canal, where the locks have a limiting length of 1000 feet, can enter either of the two docks which are to be built at Norfolk. This new work is of the most urgent character and it should be rushed to completion with all possible speed.—*Scientific American*, 27/4.

CONCRETE LIGHTERS.—S. W. Stewart, president of the Ambursen Construction Co., 61 Broadway, announced recently that the Navy Department had awarded a contract to his company for the construction of four reinforced concrete fuel oil and coal barges, designed to carry 800 tons, to be used in New York harbor. It is believed that the Navy Department will build 12 of these vessels. One of the chief difficulties in designing these vessels was to make the concrete oil proof. This was met successfully, the company says, and it believes that the method of construction devised will be found suitable for oil tankers in the Gulf and coastwise service.—*N. Y. Herald*, 25/4.

BALTIMORE TO BE BIG NAVAL SHIPPING PORT.—Baltimore is to be made a large base for the shipment of naval supplies, according to information gathered at the City Hall. Representatives of the Navy Department have been in conference with the Board of Estimates over the use of the city wharf at the foot of Hughes Street.

The plan as outlined is to build a warehouse and depot on a lot 20,000 feet square and to utilize other portions of the pier, said to be well adapted to the uses of the government as a shipping center. It was stated that an expert from Washington would be in Baltimore in a few days to make an inspection of the pier and let the city officials know exactly what is wanted.

The Board of Estimates is disposed to let the government have all the water-front space it might need to help win the war, and the Hughes Street wharf will be leased if the navy needs it.—*Baltimore Evening Sun*, 25/4.

DRY DOCK.—Charleston is happy over the decision of the Committee on Naval Affairs of the House of Representatives to have $9,000,000 authorized for the construction of a huge dry dock at the Charleston Navy Yard and the dredging of a 40-foot channel from the yard to the sea. A first appropriation of $1,500,000 for channel work has already been adopted by the House of Representatives as part of the Rivers and Harbors Bill, and the maximum authorization for this work is $5,000,000.

The channel will be 1000 feet wide from the navy yard to the sea, which will take in a very large part of the Cooper River, and will be 40 feet at low water, thus making Charleston one of the few very deep ports of the world. The dock is to cost $4,000,000 and will be capable of handling any vessel that can pass through the Panama Canal. The dock appropriation is in the new naval bill.—*N. Y. Herald*, 10/5.

AVIATION IN THE NAVY.—In the course of the discussion on the naval appropriation bill in the House of Representatives on April 19, much information was divulged as to the condition of aviation in the navy, the establishment of bases, progress in the manufacture of flying machines, and the merits of the Liberty Motor. In fact, after the discussion of the item of $188,042,969 had gone on to the point of exhausting nearly all the secrets of our aviation program, Mr. Butler called the House to attention by asking the question: "Does not the chairman think that we have now told the Hun all we know about the motors and that we have not flying machines?" This query brought the discussion to an abrupt end.

Among the facts revealed in public for the first time were that the U. S. Navy had aviation bases in operation in Ireland and Scotland as well as in England and France. The largest airplanes we are constructing now cost $42,000 each, $30,000 for the machine and $6000 each for the two engines. Mr. Padgett explained that much of the delay in the carrying out of our aviation program was due to the inability of the industry in America to live up to its promises although they were now making an improvement in respect to deliveries. He also quoted Chief Constructor David W. Taylor, U. S. N., as stating that the navy was up to its promises and expectations with training machines, but that they were about 60 days behind on the combat or fighting machines, and they were making good progress toward getting up to their expectations.

Mr. Husted said he had found that in the army they are turning out flying students at the ground schools much faster than they were able to provide them with planes in which to learn to fly, and his inquiry brought out the statement that the same condition existed in the navy. Mr. Padgett, however, quoted Colonel Deeds as stating that there is not an aviator abroad who has not machines with which to fly, and that there will not be one abroad that will not have machines when he needs them. These would be foreign machines, he explained, but he made the point that the men who would have the planes they needed now and that we had begun to ship machines abroad to provide for the future. Chief Constructor Taylor stated to Mr. Padgett that the manufacturers would be turning out the big 92-foot machines at the rate of two a day "as soon as they got their plans developed."

In response to a question, Mr. Oliver stated that all the navy airplane stations were now provided with training planes and that they are fairly well equipped with service planes for advanced training. At all our foreign stations we have a sufficient number of pilots, mechanics, and other trained officers to carry on the work at present. All these planes, however, had been obtained from France. He added that the navy was now prepared to ship at least 20 service planes abroad and that "shipments will steadily increase, so Captain Morrill has informed me." Mr. Oliver stated that "we had something like 320 officers and men in the aviation service when war was declared; we have now more than 17,000."

Mr. Britten declared that "aviation in the navy to-day is almost a complete failure," after stating that on April 1, 1917, the navy had 93 completed seaplanes with 133 under construction. On January 1 of this year the navy had 324 completed planes all told, many of which were obsolete, this being an increase of about 100 in nine months of war. "If that is making real progress," he declared, "I do not know the meaning of the word."

Mr. Farr pointed out, as a defence of the Liberty Motor, that Germany had maintained her strength in the air largely through one machine, the Mercedes; that she has made no changes in that machine but by tactical experience and ability has utilized it to great advantage.—*Army and Navy Journal*, 27/4.

FORD SHIPYARD FOR "EAGLE" CLASS BOATS.—Where was a swale there stands what is said to be by engineers the largest building in this country, which might as well include the entire world without fear of refutation. It is 300 feet wide and 1700 feet long, of steel and glass construction. In it will be housed at one time a score of the craft that are to be turned out in wholesale quantities for the government. And it is only one of a group, the rest of which are almost as imposing.

Where once Roulo creek twisted and turned and back-tracked across the fields, there are heavy concrete bases that will support transfer tracks leading to the launching slip.

When you ask what became of the creek, they point off across the field toward Maple road, and in the most matter-of-fact way tell you that they put it over there. Such a trifling matter as sending a creek that in many sections would be counted a river down through a specially constructed channel, with concrete retaining walls, and appropriating the course it had run for generations for other purposes, doesn't particularly interest the engineers in charge of this job, because to them it is a minor item.

The same fine disregard for natural obstacles is displayed all along the line. Whoever heard of putting a shipbuilding plant inland and bringing water to it? Yet that is exactly what is being done here.

The plant is commonly spoken of as being on the Rouge River.

The building where the boats are to be assembled is fully a half mile from the Rouge at its nearest point. The launching basin adjoins this building, so a channel wide and deep enough to accommodate a good-sized freighter is being excavated, or, perhaps, sloughed would be a better term to employ, because of the manner in which it is being done.

Usually on such a job a number of dredges would be put at work digging the channel, and the dirt taken out would be loaded on scows and towed away, or it would be piled up on the bank, a barrier to further progress in that direction. Not so here, where saving of time is the big consideration.

Outwardly the huge hulk that is eating its way through the fields with almost incredible rapidity resembles, to the layman, an ordinary dredge. However, it differs very materially, for instead of a big shovel coming up with its slimy load a giant agitator revolving at any desired depth in the water moves from one side to the other of the channel, working the soil loose and mixing it with the water. It is then drawn into a flexible pipe line, and by means of air is pumped for a quarter of a mile on to low ground, where the dirt can be used for filling, the water draining off naturally. Thus, with a single operation, two purposes are served, and the excavator eats its way into the bank with a speed that discounts the old system, having a capacity of 500 yards per hour.

The water in this channel will average 12 feet in depth, and there are portions of the course where as much more dirt must be sloughed off above the water-line, so that aside from the unique manner in which the task is being accomplished it is an undertaking of magnitude.

Originality crops out on every side, and everything is planned with a view to expediting the assembling of the boats which are so sorely needed

right now, and which, it is predicted, will be in commission before summer is at hand.

There will be no duplication of effort, no unnecessary handling of material, with the attendant expense and loss of time. The raw stock is to be taken into the fabricating plant of itself 150 feet wide and 450 feet long, on one side, cut and shaped and sent out on the other side to the assembling building. Here there will be three shipways, each capable of accommodating seven of the craft at one time, with a serving track between each of the shipways, from which material can be delivered to the workers as needed.

Each boat is to be mounted on special trucks running on tracks laid lengthwise of the building. Several groups of operations are required in assembling a boat, and as fast as one is completed the craft will be moved along to the next band of workmen, until eventually it emerges at the far end complete.

Instead of breaking a be-ribboned bottle of grape juice over the bow of the vessel as it slides off the ways, in conformity with time-honored tradition, it will be taken in hand by a hydraulic lift and deposited in the water, ready for the machinery and the finishing touches that will be given a little farther down the slip.

And by the time the boat is in position for the machinery the truck that carried it will be back at the end of the line ready to start the trip all over again.

It is an adaptation of the conveyor assembling system which has been developed so thoroughly in the putting together of cars at the Ford Motor Company's factory, and it is predicted that, making due allowance for the difference in size, the boats will be coming through with the same proportionate speed when this plant is in full running order.

As for the boats themselves—*Eagles* they will be officially christened—little can be said at this time, because publishing the details could easily be construed as treasonable on the ground that it was furnishing aid to the enemy; although by no stretch of the official imagination could such action be regarded as giving comfort to him. Indeed, the best naval constructors in this country, and some of the brightest minds abroad, who have had a hand in fashioning the craft, or who have been permitted to go over the plans and see the working model, are unanimous in asserting that once afloat these chasers will be anything but a comfort to the Kaiser and his cohorts.

Built for Business.—From stem to stern, from keelplate to the top of the radio staff, every bit of the craft will be steel, wood being entirely eliminated. The *Eagles* are not being built for display. They will be required to undergo the hardest sort of usage, and, while everything is complete, it is evident that business first was uppermost in the minds of the designers. The hull is divided by water-tight compartments that render it practically unsinkable.

The prow is knife-like, and it is reinforced in a manner that is most deceiving to the casual observer, for the boat will be able to deliver a terrific blow to an enemy craft without suffering any damage. It is intended for hit and run purposes, and its mechanical equipment is such that it can be handled almost as easily as one of the automobiles that have made their maker famous.

When it comes to mixing things with the enemy, the *Eagle* has little to fear. In the first place, it is of exceptionally light draft. Then the hull is of such a type that should a torpedo find it, the missile would probably glance off before it did any harm.

Here is an interesting thing in connection with these sub-chasers—every step is interesting, for that matter, but the procedure here was so unusual as to single it out for distinction.

The first *Eagle* was built miles from any body of water, which of itself upsets every precedent. The plans had hardly been received from the Navy

Department in Washington—and they were little more than a couple of drawings—when the best engineers and draftsmen in the Ford organization were put to work. None of them had ever helped build a ship, but that made no difference. Bit by bit they figured out a model on paper, and before the last drawings were complete the ribs of the hull were in place, and the plates were being put on the sides.

One of the big factory buildings served as "dry dock." Here, far from its native element, the boat was assembled complete, even to the radio outfit. It was a new undertaking, but so carefully had it been planned that no material changes were found necessary.

With the first boat completed, the company was in possession of a set of perfect patterns from which others could be fashioned in any desired number. Talk about standardization! You could take a whole fleet of these boats, jumble the parts together, sort out what was needed, without any reference to "serial numbers," and each unit would fit into place as though made especially for that particular craft. That is a long step in the direction of quantity production that seasoned shipbuilders seem to have ignored up to the present.

Then the Ford company proceeded to give another demonstration of how speed can be attained. It might have decided to install special machinery to handle the material that is to go into these chasers. With good luck, production could possibly have been begun within a year and one-half. But the boats are needed now—therefore, make them now. The very machinery that had been used in producing automobiles was turned over to the shipbuilding department. The production of motor cars was cut down one-third, in conformity with the government plan, and it will be reduced still farther if found advisable.

Presses and shapers and other machines needed in the work were shifted from the parent plant to the shipyard on the west side, and while this was being done parts were fabricated at the main factory and sent across town by rail so that no time would be lost.

These engines are being built at the plant of the Ford Motor Company, and will be laid down ready for installation in the hulls on the 1000-foot docks at the outfitting station.

To an outsider the transformation which has been wrought suggests that the day of miracles has not passed entirely. The men who are engaged in the work take an entirely different and more practical view of it.

"When you have one of the greatest organizations in the world back of you, with Mr. Ford for boss, and his money to spend to the limit, so long as you produce results, you can do almost anything," said "Bill" Knudsen, as we hiked along a well-rolled cinder roadway where a few days before had been a sinkhole into which carloads of brickbats had been dumped before any bottom could be formed. "Of course, the plant has gone up in a hurry, and it looks now as though we would make our schedule, which was a stiff one. But everybody has pulled together fine. And why shouldn't they? The fellows over in the trenches are working a heap harder than we do, no matter how we speed up."

As for Henry Ford, the presiding genius who is putting millions into a plant that may or may not be available for other purposes after the war is over, he only smiles when the matter of such a tremendous investment is mentioned.

"If these boats will hasten the end of the frightful carnage abroad and bring peace that is lasting, there will be no occasion to worry about the money spent," he remarked in discussing the project. "We are in this thing to a finish and we've all got to work and give until it hurts—and then work and give a lot more, because while we did not make it, it is your war and my war, and we must see it through to a successful conclusion."—*Detroit Free Press*, 28/4.

POLICY

INTER-ALLIED NAVAL COUNCIL IN SESSION.—The Inter-Allied Naval Council met recently at the Ministry of Marine, with Georges Leygues, French Minister of Marine, presiding.

Vice Admiral Sims, Captain Twining and Commander Babcock represented the United States, Rear Admiral Hope and seven other officers were present for Great Britain; Vice Admiral Thon di Revel and four other officers for Italy, and Rear Admiral and Captain Hamane for Japan.—*N. Y. Herald, 27/4.*

LACK OF AMERICAN DRY DOCKS.—Lack of dry docks in America constitutes almost as serious a menace as the submarine itself, according to a report issued by the War Shipping Committee of the Philadelphia Chamber of Commerce, in which vigorous appeal is made for additional dry dock facilities at the port of Philadelphia. The committee recommends to the United States Shipping Board that at least four dry docks of 350 feet or more in length be located at this port and that nothing should be left undone to have the construction of these docks completed at the earliest possible date. The report draws attention to the fact that 35 per cent of the ship construction program is to be carried out in the yards of the Delaware River district. At the present time there is but one private dock here, which, under normal conditions, is greatly overcrowded. With the tremendous increase in shipping facilities, the American nation is confronted by a serious scarcity of dry-docking facilities, the report continues. It is pointed out that in Great Britain, which has been pre-eminently a shipping nation, the number of commercial docks exceeding 350 feet in length in 1915 was 171, according to Lloyd's Register. In America to-day there are but 27 dry docks. On the Great Lakes, where the demand for water-borne transportation has contributed to the developing of shipping to the extent of 2,300,000 tons, there were in 1915 20 docks of 350 feet or more in length. On the basis of this proportion the report states that the United States will require 182 docks for our future mercantile fleet.

The amount of attention which will be required by the wooden ships as well as by the fabricated steel ships impresses the members of the War Shipping Committee of the Chamber as being a most important consideration. Engine-driven wooden ships engaged in transatlantic service would necessarily be subject to great strain and stress and could only be maintained in water-tight condition by constant recourse to dry-dock overhauling. Emphasis is laid on the fact also that vessels torpedoed near the Atlantic coast might be saved if they could be worked back to our ports and repaired promptly. Scarcity of dry docks on the Atlantic seaboard at the present time would render abortive any attempt to repair vessels in this condition, the report declares. From the shipping side of the question the report brings forward another point of view which is that the port of New York is overcrowded, and as it does not compare with Philadelphia as a point of origin for foreign shipments, there is only one reason why preference can be given it. That reason is that New York has nine dry docks of more than 350 feet in length. This compels vessels requiring dry dock attention to call at the port of New York. Recently a vessel for which a cargo was awaiting in Philadelphia was compelled to leave that port and go to New York for certain necessary repairs; naturally it never came back, taking a cargo on at New York.

In the report, the opinion of the Department of Wharves, Docks and Ferries of the city is cited to the effect that unless dry docks are built at Philadelphia promptly the advantages of this port with its fresh water, nearness to industries, distance from the sea sufficient to make it immune from attack and at the same time sufficiently near to be easy of access, will all be wasted. The report of the committee has been transmitted to the United States Shipping Board, to Rear Admiral Bowles, to Mayor Smith, and to other officials interested in the development of the port of Philadelphia.—*Shipping, 27/4.*

MATERIAL

$200,000,000 ADDED TO BIG NAVAL BILL.—Additional appropriations of about $200,000,000 have been added by the Senate Naval Affairs Sub-Committee to the naval appropriation bill, which carried appropriations of $1,358,000,000, as it passed the House. Of the increases, about $120,000,000 are for naval ordnance.

The sub-committee recommended an increase of the $24,194,000 appropriation for ordnance and ordnance stores by $6,328,000; addition of $45,537,000 to the House appropriation of $48,309,000 for new batteries for ships; increase of $34,530,000 to the $39,259,000 for ammunition for vessels; increase for torpedoes and appliances from $1,000,000 to $11,000,000 and an addition of $13,000,000 to the $5,000,000 for reserve ordnance supplies.

The sub-committee also inserted new amendments providing $3,000,000 for a navy mine depot and $9,150,000 for a navy nitrate plant.—*N. Y. Herald*, 10/5.

FUEL OIL SHORTAGE SHOWN.—Opening of oil lands set aside as naval reserves, in order that the increasing shortage of fuel oil on the Pacific coast may be relieved, has been urged upon Secretary Daniels by representatives of oil companies and others. No decision has been reached, Secretary Daniels said.

The attitude of the department has not been changed since Mr. Daniels expressed his approval of the operation of naval oil reserves under federal supervision and the utilization of some part of the production for the relief of the situation on the Pacific coast.

The representatives of the oil interests told the Secretary they were perfectly willing to place their interests in the naval reserve lands in the hands of the President for settlement.—*Evening Star*, 7/5.

NAVY EMERGENCY RATION.—The newly adopted emergency ration for the navy will consist of 8 ounces of bread component (cooked wheat ground to a powder), 5 ounces of meat component (fresh lean beef reduced to a powder), and 1 ounce of common salt, all thoroughly mixed and compressed into tablets, four to a package. The chocolate component will be formed into cakes of 1½ ounces each. Three packages of tablets and three cakes of chocolate will be inclosed in a round tin bearing the following directions: "Calculated to subsist one man one day. Bread and meat component to be eaten dry or stirred into cold water; or one package may be boiled five minutes or longer in three pints of water and resulting soup seasoned to taste; or one package may be boiled in one pint of water for five minutes, making a thick porridge to be eaten hot or cold; when cold may be sliced and fried if bacon or other fat is available. Chocolate component may be eaten dry or made into liquid by placing the chocolate in a cup held in hot water. After melting add boiling water slowly, stirring constantly, until desired consistency is obtained." This ration is criticised by some of the food experts as containing too much salt and as otherwise calculated to produce undue thirst. The meat component is not regarded as essential by some of the authorities, who prefer only whole wheat bread with, if desired, bacon or sardines. In fact, the ideal emergency ration for naval use is said to be canned beans, sardines, and brown bread, as palatable and nutritious and as containing the necessary percentage of water. The difficulty of such a ration, however, is in keeping it intact for use in an emergency, as it is apt to be surreptitiously drawn upon as an attractive edible which the adopted ration is not under ordinary circumstances. This is on the theory that the navy is not likely to need to subsist on an emergency ration for very long at a time, and men who survive a disaster at sea could live for several days before being rescued, without any food at all, provided they had sufficient drinking water.—*Army and Navy Register*, 11/5.

DUTCH EMBARGO HURTS.—*America Must Seek Other Sources of Tin, Quinine and Other Things.*—Holland has placed an embargo on the exportation from the Dutch East Indies of tin, tin ore, cinchona bark, quinine, quinine salts and kapok, all of which are needed in large quantities by the United States for war purposes.

Official notification of the embargo, effective April 22, was received April 26 and caused much perturbation. Officials declined to indicate the probable reasons, but in some quarters it was suggested the measure was in retaliation for the American requisitioning of Dutch ships. Elsewhere it was thought to have been prompted by the critical situation in which Holland finds herself with Germany.

The embargo on tin and tin ore will prove especially embarrassing to the United States. Supplies needed for munitions and food preservation were expected to come from the Dutch East Indies, as the British are taking the entire output of the Straits Settlements. About 16,000 tons of tin was bought by the United States last year from the Dutch East Indies, and the amount probably would have been increased this year.

Cinchona bark, quinine and quinine salts are needed for medicinal purposes by the army. Kapok is a vegetable product, used in making hammock mattresses for the navy.

The United States is almost completely dependent for tin on the outside world. It is probable that Bolivia now will be looked to for a supply.—*Baltimore Sun*, 27/4.

PERSONNEL

NAVAL BILL CHANGES.—Some important changes are to be recommended by the Senate Naval Committee in the naval appropriation bill, which has been under consideration by the committee for some days, during which time representatives of the Navy Department were heard in explanation of the needs of the naval service. As the bill passed the House, the bill authorized increase in the enlisted strength to 228,000 men, all of which above the present authorized permanent strength of 93,000 was to be temporary for the period of the war. The Senate Committee has decided to recommend an increase of the permanent strength to 131,645 men, with an additional allowance of temporary strength to bring the total of both classes to 228,000, as carried by the House bill. The permanent allowance approved by the Senate Committee is the minimum number required to man the vessels of the navy of a permanent character now in commission and that will be placed in service up to July 1, 1919, and it does not provide for recruits under training, aviation personnel, etc., which will have to be carried in the temporary allowance. Notwithstanding the showing of the departmental officials of the need for increasing the permanent allowance of enlisted men, in order to provide personnel for new ships as they are ready for service, Secretary Daniels indicated his opposition to such increase, and would only approve increase of temporary character. This is one of the reasons that only temporary increase was authorized by the House bill. Certain members of the Senate Committee appreciated the need for an increase of the permanent allowance, and when this was brought to the attention of Mr. Daniels he consented to approve only so much as is absolutely needed for new ships that are expected to be ready for service between now and July 1, 1919, and he would not approve any additional permanent allowance for recruits under training, the air service, etc.—*Army and Navy Register*, 11/5.

READJUSTMENT OF NAVAL PERSONNEL.—Data is being prepared in the Navy Department showing reasons why the law should be amended by removing the limitation against the temporary promotion of officers, on the basis of the temporary personnel, beyond the grade of lieutenant commander. This data will be submitted to the Senate Naval Committee in an effort to have the pending naval appropriation bill amended to provide

temporary officers in the higher grades on the same ratio as allowed for the permanent commissioned personnel. The act of August 29, 1916, provides that the total number of commissioned officers of the active list of the line of the navy, exclusive of commissioned warrant officers, shall be 4 per cent of the total authorized enlisted strength of the active list, exclusive of the hospital corps, prisoners undergoing sentence of discharge, enlisted men detailed for duty with the naval militia, and the flying corps. The act also provides that the commissioned line officers of the active list shall be distributed in proportion to one of the grade of rear admiral to four in the grade of captain, to seven in the grade of commander, to fourteen in the grade of lieutenant commander, to thirty-two and one-half in the grade of lieutenant, to forty-one and one-half in the grades of lieutenant (junior grade) and ensign. It is desired to have the commissioned personnel of the line based on the temporary authorized enlisted strength distributed in the same proportion, instead of being limited to the grades of lieutenant commander and below as at present. It will be shown to the committee that already there is need of a greater number of flag officers for duty afloat than are available with the present number of officers in that grade, and the need will increase as the war goes on. In fact, at present about 50 per cent more flag officers, captains and commanders are needed than are in those grades.—*Army and Navy Register*, 4/5.

RANK AND PRECEDENCE IN NAVY.—The Secretary of the Navy proposes the enactment of a law providing that officers of the line and staff of the navy, who have been or may hereafter be permanently appointed in the same grades and ranks in accordance with the act of May 22, 1917, shall take rank and precedence over temporary appointees. In submitting this matter to Congress, Mr. Daniels says:

"As the law now stands with relation to rank and precedence of officers, those appointed for temporary service under the act of May 22, 1917, take rank with permanent officers of the navy of the same rank and grade according to the dates of their commissions, an officer of an earlier date of commission taking precedence over an officer of a later date in the same rank or grade. As a consequence, officers newly appointed in the lowest grade, who have had little or no training to fit them for the duties of their office, take rank and precedence over graduates of the Naval Academy who may be permanently appointed only a few days later after the completion of a course of three or four years of intensive training. The benefits of the proposed legislation will extend further. Some officers of the permanent navy who have been temporarily advanced under the act of May 22, 1917, to the grades of rear admiral, captain and commander will be selected to fill permanent places in these grades. Although they may be selected by the board for permanent promotion over other officers who hold temporary appointments in the same grade, yet under existing laws they will not gain seniority over such officers until the termination of all temporary appointments under the act of May 22, 1917, at which time permanent officers holding temporary commissions in higher grades will revert to the places from which they were advanced, or to the places to which they are entitled to be promoted under the act of August 29, 1916. I believe it is not to the best interest of the service that temporary officers should take rank and precedence ahead of permanent officers of the same rank and grade by reason of earlier date of commission alone. Favorable consideration of the inclosed draft of a bill is, therefore, recommended, with the request that it be enacted as a separate bill or be inserted as a provision of some pending legislation relating to the personnel of the navy."—*Army and Navy Register*, 4/5.

MIDSHIPMEN.—While the result has not been definitely announced, it is believed that the class entering the Naval Academy in June will number

not less than 1000. The largest class heretofore was 750. Authority has been included in the naval appropriation bill for the construction of a new auditorium at Annapolis. Hereafter, candidates for the Naval Academy must be between the ages of 16 and 20 years on April 1 of the year admitted, as noted on our Congress page.—*Army and Navy Journal*, 11/5.

WILL ENLARGE MARINE CORPS.—*House Votes to Make Strength 75,500.*—Increase of the Marine Corps' strength to 75,500 was voted by the House to-day to enable the navy to put an entire division of the sea soldiers at the front with Pershing's Expeditionary Forces. Provisions for the increase, which would add about 50 per cent to the enlisted personnel, was approved by the Naval Committee, and promptly was made a part of the naval appropriation bill under consideration in the House.

The action was based on a recommendation from General Pershing that the brigade of marines now attached to his forces be raised to a complete division. With 75,000 men the Navy Department not only could maintain a division of 27,000 men in France, but would be able to organize certain advance base forces that have been planned for some time.

It was learned to-day that in conformity with his promise that the marines would be moved up to the front at the earliest possible opportunity, General Pershing recently has relieved them of the guard and transportation duties upon which they have been engaged since they landed in France.

A proposal by Representative Padgett, chairman of the Naval Committee, to create three additional major generals in the Marine Corps was withdrawn temporarily during to-day's debate in the House. With an appropriation of $25,000,000 to take care of the additional number of marines, the bill carries a total of $1,352,608,673. House leaders predicted its passage to-morrow.—*Baltimore Sun*, 20/4.

SELECTION PROMOTION FOR MARINES.—Marine Corps consideration has been given at the headquarters of the corps to the method of making the advancements, of which there will be many as a result of pending legislation. It has been decided that selections for promotion to the grades of colonel, lieutenant colonel and major shall be made by a board of about seven officers from among the brigadier generals and senior colonels of the corps. Owing to the fact that the grades of first and second lieutenants are filled now by those that have been serving a comparatively short time as commissioned officers, and not enough opportunity has been had to determine comparative fitness, promotions to the grades of captain and first lieutenant will continue by seniority in the regular corps. Unless the naval appropriation bill as reported to the House is changed in that respect, practically all of the promotions will be of temporary character, the only exceptions being in the case of those on account of casualties in the permanent personnel and in the case of those resulting from the appointment of one colonel as permanent brigadier general to fill the vacancy caused by advancement of a brigadier general to fill the single place in the grade of major general proposed by the bill. Of course, however, in view of the prospects that there will be an increase allowed much greater than the 20,000 originally proposed, it is likely that a greater number of general officers and the colonels and lieutenant colonels than now carried by the bill will be authorized, the bill as reported to the House carrying, in addition to the permanent major general, three brigadier generals, twelve colonels and twelve lieutenant colonels as an additional temporary allowance.—*Army and Navy Register*, 20/4.

RESERVE AND MILITIA

AMENDMENT OF NAVAL RESERVE LAWS.—Important changes in the naval reserve organization are contained in the naval appropriation bill now

before Congress. The old naval militia and the national naval volunteers will cease to exist, and the members of the latter organization are automatically transferred into Class 2 of the Naval Reserve force, known as the "Naval Reserve," for general service, and confirmed in the rank, grade and rating they now hold in the national naval volunteers, without examination. The Fleet Naval Reserve and the Naval Reserve will become practically identical, both classes being composed exclusively of officers and men who are fully qualified for service in their rank or rating on board of combatant ships. The medical and dental reserve corps will cease to exist, and members of those organizations will be enrolled in the Naval Reserve force in their present grades and ranks.—*Army and Navy Register*, 27/4.

U. S. MERCHANT MARINE

WHAT THE SHIPPING BOARD HAS DONE.[1]—By Edward N. Hurley, Chairman of the Shipping Board.—If by the exercise of magic a bridge could be thrown across the Atlantic over which our armies, their artillery and supply trains could move rapidly and unhampered to the battle lines in France, would any military man in Berlin, Vienna, Rome, Paris, London or Washington have any doubt but that the world would be made safe for democracy before the year goes out? We have the men, we have the guns, we have the supplies. But without means of getting them to the front we might as well be without them. And unless we get our men to the battle line we will not win this war.

So it all comes back to ocean transportation—to the vital need of ships. Fail there and we fail utterly. Upon the Shipping Board has devolved the responsibility of supplying this need, and supplying it under the most extraordinary conditions that ever existed—supplying it at the most crucial period of the war's history, at a time when every other industry is being taxed to its utmost capacity in the matter of materials and labor to provide war necessities.

The handicaps have been many. We were not a maritime nation. Our flag had almost vanished from the seas, and with the exception of a few widely scattered shipyards, merchant marine construction had almost become a lost art with us. Then came this sudden call to outdo the rest of the world in the upbuilding of a merchant marine; a call coming at a moment when the navy was undergoing the greatest expansion in its history—when most, if not all, of the established yards were feverishly engaged in rush construction on dreadnaughts, destroyers, submarines, fuel ships, tenders and other auxiliary craft, and when munition makers were absorbing that part of skilled labor which had not been called to government navy yards or private shipbuilding plants. So it was a case of not only working from the ground up, but of first securing the ground upon which to make a start, some of it, marsh land, which had to be filled in before launching ways could be laid.

When we took hold of this job of shipbuilding we found there was no shipyard in existence with which we could place an order. The old yards, with their trained force of shipbuilders, were filled to capacity. Seventy per cent of their space was taken by the enlarged naval program. The remainder of the space was taken by the orders which had been placed by American owners, and by foreign owners, who, pressed for more ships, had filled the yards of America to overflowing.

We were faced with the necessity of creating an entirely new industry. We had to establish the yards first, get the shipbuilders to take charge of them, and train the men to build the ships. There were 37 steel shipyards in America at the time of our entrance into war. We have located 81 addi-

[1] From an address before the National Marine League, New York, March 26.

tional steel and wood yards, while 18 other yards have been expanded. We are building in the new and expanded steel yards 235 new steel shipways, or 26 more than at present exist in all of the steel shipyards of England. The new industry we have created will make America the greatest maritime nation in the history of the world.

Struggling against something that cannot be avoided is more baffling than struggling against something that can be. You can appeal to striking men to go back to work, but you can make no appeal against zero weather. We did what we could. We told the new shipyards to go ahead and use dynamite in locating their pilings. The men in those yards fought the bitter winter. They had the same spirit, and demonstrated the same pluck and unselfishness as the men in the trenches. And they have virtually completed the job of building America's new shipyards—the new yards that will make us the greatest shipbuilding nation.

It has been an uphill struggle, but we have had our moments of elation when we have felt that we are making progress. The record made by the Skinner and Eddy Company of Seattle is a case in point. That company laid the keel for an 8800-ton vessel, which was launched in 64 days. She was delivered to the Fleet Corporation on January 5 and started on the first voyage on January 14. This record accomplishment shows what can be done in live, wide-awake efficient American shipyards.

Then a few days ago we received a telegram from the Moore Shipbuilding Company of Oakland, Cal., announcing the successful launching of one of their large vessels. Twenty minutes later we received another telegram from the same company announcing the launching of a second ship of the same type, and 40 minutes afterward a third telegram saying that a third vessel of similar character had gone overboard. This was the record of one American shipyard. The launching of three 9400-ton vessels in a single afternoon—an accomplishment which I believe is unrivaled in the world's annals of shipbuilding.

The total amount of our steel construction on March 1 was 8,205,708 dead-weight tons. This is made up of 5,160,300 dead-weight tons under contract with the Emergency Fleet Corporation, and 3,045,408 dead-weight tons of requisition vessels.

Of this total steel construction, [illegible]1,568 dead-weight tons, or approximately 28 per cent, has been comple[illegible]. That means that in addition to the building of our big new yards we have also been building ships. That is, the program for steel ships has advanced 28 per cent toward completion. Of the amount of steel ships under contract and under requisition, 655,456 dead-weight tons, or approximately 8 per cent, were actually completed and in service on March 1 of this year, nearly a month ago. This amount of floating tonnage exceeds our total output in 1916, including steel, wooden and sailing vessels, by approximately 50 per cent.

Notwithstanding the difficulties of organization, the handicaps of bad weather conditions, transportation embargoes and railroad congestion, nearly as much tonnage has been constructed in American waters in the past three months as by all the other maritime nations of the world combined.

We have had to build up a tremendous administrative organization, with expert naval architects, expert traffic and operating heads, and at a time when the demand for such talent greatly exceeded the supply. We have had to negotiate for neutral tonnage. We have had to requisition and provide for the operation of the entire existing American merchant marine; we have had also to provide skilled supervision for the repairs of interned German ships which were seized.

The Germans thought that by crippling their own vessels in American waters they would be able to prevent us from using them. American ingenuity and resourcefulness gave the answer by restoring these vessels to efficiency. With the expediture of a little less than $8,000,000 (£1,650,000) we have succeeded in placing in our war service and in the service of the

Allies 112 first-class German and Austrian vessels representing a carrying capacity of nearly 800,000 dead-weight tons.

At the outset the 37 old steel yards began increasing their capacity until they now have 195 ways as against 162 eight months ago. Other parts of their plants have increased proportionately. We then made provision for additional new steel yards, some of which have been given financial assistance by the Emergency Fleet Corporation. Thirty additional new steel shipyards are thus being erected, with a total of 203 shipbuilding ways. Thus we now have in the aggregate 67 steel shipyards either wholly or partly engaged in Fleet Corporation work. These yards will have a total of 398 steel building ways. Of these, 35 yards with 258 ways, are on the Atlantic and Gulf coast; 19 yards with 6 ways are on the Pacific, while 13 yards with 74 ways are on the Great Lakes.

Our program for building wooden ships has been beset with many difficulties and handicaps which could not well be foreseen. A year ago, wooden shipbuilding in the United States was almost a lost art. We found 24 old wooden shipyards, with 73 ship ways. The capacity for wooden shipbuilding has been increased until we now have 81 wooden shipbuilding yards, with 332 ways completed or nearing completion.

Assuming that these ways will each produce two standard ships per year, we should turn out about 2,300,000 dead-weight tons of wooden ships annually. These 332 wooden shipbuilding ways, now nearing completion, added to our 398 steel building ways, will give us a total of 730 berths upon which to build steel and wooden vessels. When you consider that we had only 162 steel building ways a few months ago and 73 wooden shipbuilding ways—a total of 235—an increase is shown of 495 wooden and steel berths on which we can build ships.

With our total of 730 wood and steel ways, we will have 521 more berths than Sir Eric Geddes in his recent speech stated England has at the present time.

From the transportation standpoint, we must expect absolute freedom in the movement of our materials; otherwise the speeding up of manufacture is wasted, and consequent delays in finished ships will result. We look to the Railroad Administration with full confidence that they will supply our needs in this respect.

The situation giving us the most concern is the completion of turbines and engines. The very rapid expansion of the shipbuilding program caught the turbine and engine manufacturers totally unprepared. Special tools of all kinds were required for the engine builders' shops, and these tools had to be secured from manufacturing shops already overcrowded with war orders. In addition to this, the severe weather and the transportation tie-up seriously delayed the construction of some of our largest turbine building plants. We anticipated delay during the earlier months for lack of the turbines and engines, but expect to make up for the early shortage.

The proposal to build ships of concrete was first regarded as a fascinating absurdity. On March 14 there was launched from the yards of the San Francisco Company the first concrete steamship, a vessel which the builders christened *Faith*. We hope she will exemplify her name.

Now as to labor—our strong right arm! There has been much talk of conscripting labor, of forcing it into shipyards as our soldiers have been brought into the camps. I wish to put myself on record as being opposed to the conscription of labor. I do not believe conscription necessary, for I believe labor itself will produce conditions which will render idle all thought of conscripting workmen. The vast majority of our workmen are men of intelligence, and when they come to a full realization of the fact that any defection on their part now will not only imperil the nation, but will injure their fellow-workers in almost every field of industrial activity, I feel sure they will respond to all demands made upon them. Unless they fully do their part, their brothers will suffer.

It would be useless to manufacture material and supplies and pile up the products on the wharves if there are no ships to transport them. So, unless our ship workers do their best, other industries must slow down or halt completely, with the result that thousands of workers throughout the country will suffer for lack of employment.

I believe that labor has begun to realize that fact, but I want to drive it home to them; for there are some, I regret to say, who do not yet sense their responsibility. There are many who are not working to their full capacity. There are many who, because of the high wages they are earning, are prone to take too many holidays. Labor generally throughout our shipyards is to-day receiving the highest rate of wages ever paid for similar work in the history of the world. The additional cost of our ships, due to increased wages in shipyards covering the program we have mapped out, will be in excess of $300,000,000 (£61,500,000). We expect, and we have a right to expect the country has a right to expect, that labor will render for this increase of wages a corresponding increase in production—that is the output of ships.

There have been inefficient shipyard owners, as well as inefficient workmen. Where there is an inefficient owner, who does not understand the viewpoint of labor and who thinks only of his profits, labor has a right to complain. We intend to know what the costs and the profits are in every yard. We feel that the public is entitled to this information.

We have felt that it was our duty to see to it that the problem of housing the workmen in these vast new plants we have been creating was solved with care. The cost-plus system has been banned by Congress in the housing operations, because Congress itself, as well as the rest of us, have felt that there should be a greater check, not merely upon profits, but upon the actual cost of all work done for the government.

The new yards have been established, wherever possible, away from the congested districts, and while this was necessary, it brought with it the problem of transportation as well as of housing. We are arranging now for proper transportation, as well as for proper housing.

Training of new workmen for the yards has, in itself, proved a difficult task, but we are accomplishing it. We have established a large training school at Newport News to which 247 skilled mechanics, selected from 22 yards, have been detailed for a six weeks' course of intensive training to fit them as instructors for recruits brought into the various shipyards. Our latest report shows that 115 of these have completed the course and have been sent out as instructors. These men represent 16 trades. The men who are taking this instruction course will be capable of training an industrial army of 37,000 men. A department of training electric welders has also been established.

We have recruited a volunteer force of 250,000 highly skilled mechanics who have, with a patriotism that has made us all proud, agreed to hold themselves in readiness for our call. These men are being held in reserve in their present employment until such time as in the development of our yards the demand arises for their services.

In referring to what have been popularly termed our three fabricating shipyards, these assembling yards, with their 50 ways at Hog Island, 28 at Newark Bay, and 12 at Bristol, will, when they are in full operation, produce in a single year more ships than England, the greatest maritime nation of the world, has even been able to turn out in the same length of time. Already at the yards of the Submarine Boat Company at Newark Bay, 15 keels have been laid, and 13 more will be put down as soon as the remaining ways, now in course of construction, are completed. By the time the last way is finished the vessel on the first way will be well on towards completion; and as soon as it is slipped into the water another keel will be laid in its place, and we will thus have a continuous series of vessels dropping into the water from this yard at the rate of two a week. Even greater tonnage will be produced at Hog Island, with its larger number of ways and the bigger type of vessels which are being constructed there.

When the high point in the curve of production finally is reached, and the magnitude of America's shipbuilding program is realized it will be a continuous performance of production and launching. There is no doubt but that we are destined to be one of the leading shipbuilding nations in the world.

We will have the largest number of shipyards, the materials and the labor, and when our shipbuilding plants are completed and are well organized on sound business lines so as to produce ships cheaply and rapidly, we will not only produce sufficient ships to become the leader in the commerce of the world by furnishing transportation at reasonable rates, thereby performing a service to the rest of the world, but we will build ships in such large numbers and at such fair prices that we will become the mecca of the shipbuilding trade of the world.

I have outlined the entire situation—in utmost frankness—concealing nothing, for we have nothing to conceal. Shipping is the essence of the struggle in which the world is now engaged—the central beam in the whole war structure. If that fails, all else fails. We are engaged in a race with the submarine. We, of the Shipping Board, are alive to the needs of the situation. The whole government in Washington is alive to it, and there is complete co-operation to bring success in this greatest task to which America has set herself.—*International Marine Engineering*, May.

SCHWAB GIVES RECIPE FOR BUILDING SHIPS.—Charles M. Schwab to-day revealed how he purposes to put through the greatest shipping program the world has ever known in two words: "Rivalry; Enthusiasm." He had just returned from a trip through the plant of the Sun Shipbuilding Company at Chester.

"I am getting all my information as to existing conditions in the shipyards at first hand," he said, as he came from a conference in Rear Admiral Bowles's office. "I am seeing this job with my own eyes and drawing my own conclusions.

"The preliminary work in the shipyards of the Philadelphia district has been very well done. The launching of the 6000-ton *Tuckahoe* at the yard of the New York Shipbuilding Company, in Camden, within 27 days from the time work was started showed what we can accomplish in the construction of steel ships along the Delaware. It is a forecast of bigger things to come."

"But can you keep up that gait? Won't your executives and your workers tire?" he was asked.

"Not when they get two essentials to sustained quantity production," he replied. "These essentials are enthusiasm and rivalry. Virtually the whole secret of my success in handling big things may be summed up in these two words.

"You can't get men to endure extraordinary labor unless you arouse enthusiasm. You can't get them to go a stiff pace unless the man who tries to arouse them to such effort is himself a setter of the pace. The stern necessities of the times are such that production must pour out ships, munitions, and other warlike implements at a rate never before known. To achieve in such measure every American concerned in production must have a vision of free America outstripping autocracy in war as well as in peace. It is part of my job to extend that vision.

"Rivalry in the various shipyards goes hand in hand with enthusiasm. We have prizes and the less tangible, but quite as potential, incentives of proclaimed championships for rivaling gangs, pildring squads and other groups. Graphic charts are made which show at a glance how each yard is producing. The effect of this is to produce team work first in the groups comprising the working force in each yard and finally in the yard itself. The Pacific Coast just now is making the best record, but I am looking forward to a spurt along the Delaware River that will carry this district to the front."—*Evening Star*, 6/5.

SHIPPING BOARD ASKS FOR GRANT OF $2,223,835,000.—Estimates submitted to Congress to-day by the Shipping Board call for an appropriation of $2,223,835,000. For the cost of construction of ships authorized by the urgent deficiency bill of 1917, the board has requested an appropriation of $1,386,100,000 and for the purchasing and requisitioning of plants and material, $652,000,000.

Other estimates include: For acquisition or establishment of plants for shipbuilding, $5,000,000; for acquisition of lands and buildings, $50,000,000; for the operation of all ships proposed in the estimates, $500,000,000; for acquisition of plants for construction of concrete ships and for construction of concrete ships, $35,000,000; for recruiting and instructing officers for American vessels, $10,250,000; for the cost of development of port facilities, $25,000,000; for construction or completion of ships in shipyards and foreign countries, $55,000,000.—*N. Y. Herald*, 8/5.

SHIPPING BOARD'S GOAL 13,500,000 TONS A YEAR.—Working at full capacity the 157 shipyards now established in the United States will be able to turn out approximately 13,500,000 tons of shipping each year if three ships are launched annually from each of the ways. Most of the recent launchings have been accomplished in a much shorter time than that, from the laying of the keel.

The United States Shipping Board and the Emergency Fleet Corporation are putting forth every effort to obtain the highest efficiency so that, with the completion of the big government-owned fabricating yards, the nation will be in a position to supply enough shipping for all of the men who can be trained this year and next.

There are at present 398 ways for steel ships. It is proposed that contracts for steel ships will call for an average of about 8000 tons each, and this program under the "three ships from each way" estimate would provide 9,552,000 tons.

The ways for wooden ships number 332, and these, on the same time basis, with wooden ships averaging 4000 tons, would provide an additional 3,984,000 tons, giving a total of 13,536,000 tons without taking into consideration construction work which may be done on concrete ships.

Here is what has been accomplished since the Emergency Fleet Corporation took over the shipbuilding industry:

Steel contract ships launched, 18; tonnage 136,250.
Steel requisitioned ships launched, 183; tonnage, 1,195,887.
Wooden ships launched, 35; tonnage, 108,500.
Total of steel and wooden ships launched, 236; tonnage, 1,440,627.
Steel contract ships delivered, 4; tonnage, 35,200.
Steel requisitioned ships delivered, 134; tonnage, 942,171.
Total of steel ships deliveries, 138; tonnage, 977,371.—*N. Y. Times*, 4/5.

TO GET 66 SHIPS FROM JAPAN.—*Ambassador Morris Concludes the Negotiations.*—Negotiations which have been in progress for some time between Roland S. Morris, the American Ambassador to Japan, and the Japanese Government and shipbuilders have been concluded. Sixty-six steamers, aggregating 514,000 tons dead-weight, will be turned over to the United States for use in the war. Deliveries of the vessels will begin in April of this year, and will continue until June, 1919. The ships have been placed in three categories, as follows:

First.—Twenty-four ships, 150,000 tons, will be chartered through the government to the United States Shipping Board for a period of six months. Deliveries will be made in April and May. The difference between the interallied charter rates and the rates paid by America—about 18,000,000 yen—will be paid by the Japanese Government.

Second.—Fifteen ships, aggregating 130,000 tons, new or partly built, for which the United States will release one ton of steel for one ton of shipping. The United States will buy the ships at a price which will vary according to delivery, which has been fixed at May to December.

Third.—Twenty-seven ships, of 234,000 tons, to be built in Japan between January and June of next year. The United States is to buy the ships, paying $175 a ton, and releasing one ton for two tons of shipping. The new vessels will average 8,000 tons apiece.—*Baltimore Sun*, 22/4.

TWO HUNDRED WOODEN SHIPS ADDED TO PROGRAM.—Two hundred wooden ships are to be constructed as an addition to the shipbuilding program of the Shipping Board. They are to vary from 4500 to 4700 tons, dead-weight. They will be of the *Dougherty* or *Ballin* type.

The vessels will be constructed in shipyards already established and will be allotted, the Shipping Board announces, among yards most efficiently managed. Construction will begin as soon as vessels building are off the stocks.

This will increase to 580 the number of wooden ships completed, building and planned.

The board also decided to authorize construction of 25 new seagoing tugs, increasing to 100 the number of such draft now building for the board. The tugs will be employed in coast traffic, replacing those diverted overseas.—*Evening Star*, 3/5.

THE TONNAGE OUTLOOK.—The production of American shipyards in April has been estimated at 240,000 tons by the Commissioner of Navigation. This is almost 50 per cent more than in March, when 166,700 tons were completed. April ship deliveries reached 32, as against 9 in January, when the yards were hampered by unfavorable weather conditions. From now on our shipbuilding output should show a rising total from month to month. The progress thus far made justifies the belief that the production for 1918 may reach the goal set of 4,000,000 tons. It is doubtful, however, whether British yards can materially improve on their output for last year, when 1,161,000 tons were completed. Aside from the lack of man-power, Great Britain's imports of steel and iron ore from foreign countries has been very much cut down since the inauguration of Germany's ruthless submarine campaign. In a recent debate on the naval estimates before the Main Committee of the Reichstag, Admiral von Capelle spoke of the steel question as being the determining factor in shipbuilding. One of the most important economic results of Germany's U-boat warfare was the reduction of Great Britain's steel imports in 1917 by three-eighths, as compared with the year previous. To be exact, these steel imports fell from 763,000 tons to 497,000 tons. It is true that Sir Eric Geddes has denied that there was a lack of material, but British expert circles concede that the main reason for Great Britain's small shipbuilding output has been the scarcity of steel. Until this can be overcome by increasing the number of ships afloat so that Britain's steel imports can reach their former volume, no marked improvement in the amount of tonnage completed in shipyards of the United Kingdom would seem to be possible.—*Nautical Gazette*, 11/5.

FIFTEEN STEEL SHIPS, 92,000 TONS, IN WEEK'S DELIVERY.—Following the launching of the "wonder ship," the steamship *Tuckahoe*, built in 27 days at the Camden yards of the New York Shipbuilding Company, the Shipping Board announced to-day a record week of deliveries of steel vessels. In the week ended May 4 unofficial reports received by the Board show that 92,000 tons were delivered. If this average is maintained the output of steel steamships for the year will be 4,780,000 tons. As it is expected the weekly average will be increased, the year's output, it is estimated, should be five and perhaps six or seven million tons.—*N. Y. Herald*, 7/5.

THREE HUNDRED AND THIRTY-TWO-FOOT SHIP OFF WAYS; BUILT IN 27 DAYS.—Establishing the best of all war records in the building of ships, the New York Shipbuilding Company recently launched the single screw collier *Tuckahoe* 27 days after her keel was laid. Ten days from now the com-

pany promises to turn the new vessel over to the government fully completed for service.

The launching took place in the presence of the officials of the shipbuilding company, Edward Hurley, Chairman of the Shipping Board; Charles M. Schwab, and Senator David Baird, of New Jersey. Miss Helen Hurley, daughter of Mr. Hurley, christened the vessel.

The vessel is built after the English rather than the American type, and is 332 feet and 6 inches long. Her beam is 49 feet 6 inches and depth 29 feet 6 inches. She weighs 5548 dead-weight tons. The steady arrival of material and the loyalty and energy of the men are given as the reason for the remarkable record in building.

The *Tuckahoe* entered the water with boilers, stacks, masts and gun mounts, all of which were installed on the vessel during the building.—*N. Y. Herald*, 5/5.

COMPENSATION FOR DUTCH SHIPS.—It is stated that America has 69 Dutch ships, of which only 30—all over 2500 tons—are to be used in Atlantic trade. The owners will be paid on gross or deadweight tonnage a sum nearly three times the amount the British Government pays for its ships. Insurance will be included, and the only deductions are for the cost of repairs making ready for the first voyage. Owners are to be paid in cash for all losses, or have their ships replaced as soon as possible after the war.—*Nautical Gazette*, 18/4.

HOLLAND-AMERICA PIERS TAKEN BY THE GOVERNMENT.—*Project Under Way to Make Hoboken Largest Terminal on the Atlantic.*—The Holland-America line piers at Fifth Street and the Hudson River, Hoboken, were taken over by the government for the duration of the war, through an arrangement between the War Department and Captain Victor Larsen, president of the steamship company.

Negotiations are under way for the taking over of the piers of the Scandinavian-American and Ellerman-Wilson lines, which, when completed, will make Hoboken the greatest European shipping point on the Atlantic seaboard, second only to Bush Terminal in Brooklyn.

In a statement from the office of the superintendent of the Scandinavian-American line's piers, it was made plain the negotiations were well under way and that, while an agreement had not been reached as yet, definite action was expected shortly. One of the problems which have hindered the settlement has been the housing of Scandinavian shipping while in this port.

The development of Hoboken as the largest point of embarkation on the Atlantic seaboard began less than a year ago, when the government took over the piers of the Lamport-Holt line at Sixteenth Street. These were reconstructed to accommodate a greater amount of traffic, but the need of expansion became apparent within a short time.

It was then the Holland-America line piers, which lay further to the southeast, were chosen as the next development.

Negotiations were begun which ended in the government taking over the piers. They will be reconstructed, as were those of the Lamport-Holt line.

When the piers of the Scandinavian-American and Ellerman-Wilson lines are requisitioned the water front of Hoboken will be entirely under the control of the War Department. As a point of embarkation it will have facilities for shipping foodstuffs and supplies to the armies overseas which will equal those of Bush Terminal.—*N. Y. Herald*, 20/4.

FREE PORTS WANTED FOR "WAR AFTER WAR."—Business America is urging Congress to prepare the country for the "war after the war" for world trade. The first step was the passage of the Webb law which permits exporters to combine selling agencies without fear of anti-trust statutes. Now Congress is asked to provide "free ports" for United States water-front zones into which goods may be imported without payment of duties

or customs inspection. In these "free ports" imported materials may be rehandled, repacked, mixed, cleaned or even manufactured and then exported to other countries.

Goods sent into the country from free ports will pay duty, of course. The tariff policy of the government is not to be affected in any way. The purpose of the "free ports" is to handle the world's transshipment business, which now amounts to billions yearly.

Foreign trade will sail hundreds of miles to avoid red tape and expense of a custom house. Free-trade England has built up much of her commercial prosperity because of this fact.

Germany is a protectionist country like America, but before the war she was cutting into Britain's transshipment business by maintaining the old free ports of Hamburg, Bremen and Lubeck. Within portions of the harbor fronts of these cities trade and manufacture is free. The only customs activity is prevention of smuggling into the interior.

The Federal Trade Commission will shortly recommend at least four free ports for the United States at New York, New Orleans, San Francisco and the Canal Zone.

Legislation, which probably will follow the commission's report, will be drawn to provide that any city may build and operate a free port as a public utility. Under strict regulation by either the government or the cities, private corporations will also be allowed to build and operate such ports and terminals.

The experience of Germany and Denmark shows that such zones are successful. As a rule, however, no great amount of manufacturing is carried on in them beyond the repacking, cleaning, mixing or classification of raw materials for re-export or for import into the country in which the free ports are located.

The movement of ships is speeded up by the elimination of customs inspection. The warehouses in the zones are the most important feature next to the docks, and usually carry immense stocks of goods, awaiting shipping orders.—*Baltimore Evening Sun, 26/4.*

POOLING OF SHIPS COMES TO FRONT.—The pooling and operation by an inter-allied shipping board of all tonnage now operated by the United States, Great Britain, France and Italy is being jointly discussed by these nations.

Distribution of tonnage as the war sweeps into its most desperate stage is becoming more and more a vital factor in the outcome. Differences of opinion as to whether food supplies or men should have priority have caused vast confusion in recent months with the rapidly changing situation in France.

Official diplomatic advices announced a meeting of the inter-allied economic committee in France to discuss the tonnage distribution.

Comparable to Foch's Command.—The pool plan would bring the same co-ordination in the shipping shortage that was brought on the western front by the appointment of General Foch as generalissimo of all Allied troops.

The plan is to put control of the world's commerce in the hands of an inter-allied board, with authority to direct shipments of supplies, food, munitions and perhaps even troops.

Probably 25,000,000 tons of shipping would be at the disposal of the board. The board would have authority to grant priority of shipments and to withhold shipments. Under present methods of operation each war government operates its ships to fetch and carry the food and supplies it needs for its own people. This sometimes works to delay other war governments. It also often spells waste of cargo space through duplication, cross hauls and operation of ships in ballast.

Would Save Wasted Space.—It is urged a supreme shipping authority would save this waste.

Officials at Washington were reluctant to discuss the proposal beyond saying it had been discussed. President Wilson will, of course, decide the fate of the proposal. He has not sanctioned it to date.—*Baltimore Evening Sun*, 25/4.

There is talk of the establishment of an American Lloyds on the ground that American shipping interests may be seriously handicapped in the post-war economic competition if we should have to depend on a primarily British undertaking for shipping intelligence and vessel ratings. Whatever else may be the outcome of the war it appears certain that the British Lloyds will no longer enjoy a virtual monopoly in its chosen field of activities. Less than a year ago representatives of German shipping and marine insurance interests met at Hamburg and declared that Lloyds was the backbone of Britain's economic war against Germany. Were Lloyds to carry out its threat of bringing no news of German vessels after the war and of refusing to mail any of their daily and weekly reports of vessel movements and casualties to Germany, German interests would suffer incalculable injury. The absence of reliable shipping intelligence would result in a total disorganization of the business of marine insurance and all branches of the import and export trade would be crippled. Hence to guard against such a grievous injury to Germany's foreign trade when economic competition was renewed it was determined to found a German shipping intelligence bureau after the pattern of Lloyds for the protection and maintenance of German interests all over the world. The cost of establishing such a corresponding institution was placed at 2,000,000 marks. In Holland, the Dutch Steamship Owners' Union is looking into the establishment of a Dutch classification bureau in order to do away with the present dependence of Netherlands shipowners on foreign bureaus when it comes to the construction of vessels. The creation of serious rivals to Lloyds after the war is therefore certain, and the United States will before long have to decide the question whether its best interests will not be served by founding an American institution of like character.—*Nautical Gazette*, 18/4.

ARMY

ARMY OF 3,000,000 IN FRANCE NOW IS DESIRED BY HOUSE.—"Three million men for Pershing in France."

This is the goal which members of the House Military Affairs Committee hope to reach before the army appropriation bill is passed. This will be coupled with the creation of sufficient reserve to maintain an army of that size, no matter how long the war may last, if the bill goes through in accordance with the wishes of its advocates.

The size of the American Army is the one big question to be determined in the final consideration in committee of the army bill, which is to be taken up next week. Newton D. Baker, Secretary of War, will be the first official of the department to appear before the committee to advise with it regarding the number of men to be put into military service. He will be followed by Provost Marshal General Enoch S. Crowder, if the program now outlined by the Military Affairs Committee is followed.

If necessary, other high officials will be summoned later, all for the purpose of reaching a determination regarding the magnitude of the fighting force America is to put into the European battle line.

Ever since the German drive began sentiment in Congress for increasing the size of our army has been growing. It is about the only important provision in the army bill which was not whipped into shape by the Military Affairs Committee before Secretary Baker went to Europe for his survey of conditions there.

Representative Dent, democrat, of Alabama, chairman of the Military Affairs Committee, has stated many times that completion of the army bill awaited the return of the Secretary of War and that it could be finished

and reported to the House promptly after his recommendations were submitted.

The question of man power, however, was not at the acute stage when Secretary Baker left Europe that it has reached since then. Premier Lloyd George frankly has told the House of Commons that America must place more men in the field, that the age limit of the draft in England must be increased. Conscription in Ireland has been voted. These are desperate measures, and it has brought home to this country the fact that America must be ready to fill the vacancies created in the ranks of the Allies by the tremendous drain due to the Prussian onslaught.

Representative Ashton C. Shallenberger, democrat, of Nebraska, of the Military Committee, is one of the moving spirits in the committee for a proposal to increase the age limit to 40 years, and repeatedly has urged that an army of 3,000,000 men be put at the disposal of General Pershing. Representative Dent recently stated on the floor that should Secretary Baker say the word, he is ready to vote for a largely increased American Army.

It has been remarked frequently that although some formidable opposition to various bills affecting the operation of the Selective Draft law has appeared in the last two weeks, no one has vetoed a single objection to increasing the size of the army. Should the House Committee on Military Affairs report a bill carrying substantial increases, it is believed the House would enact it speedily.—*N. Y. Herald*, 11/5.

GENERAL CROWDER ASKS DRAFT BILL CHANGE.—Provost Marshal General Crowder to-day requested Congress to eliminate from the bill extending the draft of youths now 21 years of age, the amendment putting at the bottom of the eligible list those who would register under the measure, and asked that the bill basing draft quotas on the number of men in class 1 be amended to make its operation retroactive.

General Crowder made his request in letters to the chairmen of the Senate and House military committees.

Of the proposal to put the new registrants at the bottom of the list of eligibles, General Crowder said:

Says His Plan Fairest.—"The plan proposed by this office would result in these registrants being given order numbers scattered throughout the entire list of order numbers. This seems to be fairer than the plan proposed by the amendment. The result of the House amendment in many jurisdictions will be to delay the calling of these young men for a considerable time. In the meantime their status will have changed, they will have married or become integrated with the industries of the country.

"Moreover, it establishes a precedent which may be appealed to, provided aliens are registered under the provisions of the new legislation based upon treaties to be negotiated."

The plan to make the quota law retroactive would apply it to men of the new draft called while the legislation is pending. Delay in enactment of the legislation, General Crowder wrote, necessitated the retroactive feature.—*Washington Evening Star*, 30/4.

CHARLESTON TO BE MADE BIG SEAPORT AND ARMY DEPOT OF SOUTH ATLANTIC.—The United States Government has requisitioned 2000 acres of land at North Charleston and will immediately begin work on the government's development of Charleston into the principal seaport of the South Atlantic, at a cost of $20,000,000. It is known that 4000 acres are eventually to be used by the government at North Charleston, the present 2000 acres for the purposes of the Quartermaster Department and the Ordnance Department, and other lands for a great base hospital and a remount station for 20,000 horses. Actual work on the remount station has already begun.

Permanent concrete warehouses and piers will be built for the Quartermaster Department. They will be hurried to completion for use during the war, but will continue to be used after the war. The plans call for a concrete pier, with a frontage on the Cooper River of between 3000 and 4000 feet, with facilities for handling the very largest vessels afloat and all kinds of freight.

Concrete warehouses will be built behind the pier, which will be erected in a continuous line, without slips, so that vessels will load and unload lengthwise. There will be room for continued expansion of this immense pier, it is understood. Major J. L. Lee, who has been in Charleston for some time awaiting orders, will be the engineer officer in charge of construction.

For the Ordnance Department large ammunition storage depots will be built and other construction probably undertaken. This, it is understood, will be on part of the 2000 acres already requisitioned.

The remount station, which will be for 20,000 horses and mules, will be rapidly constructed, work having already commenced. It will be equipped with corrals, quarters for the men, a large horse hospital and other buildings.

It is understood that about 600 acres will be used for the base hospital that is contemplated and that the hospital will have 10,000 beds and be thoroughly equipped.

The effects of these proposed developments are already being felt at North Charleston, which is a suburb of Charleston, and land nearby is selling rapidly to people who are expecting to build homes and business structures there. Two banks have already been chartered, a large church is about to be built and several stores have been announced.

The remount station will employ about 3000 men. The other developments will employ several thousands, it is believed, though no statement as to the numbers has yet been made.—*N. Y. Herald*, 10/5.

MEDALS AND INSIGNIA AUTHORIZED FOR U. S. SOLDIERS IN FRANCE, WITH ARMY RULES AND REGULATIONS GOVERNING THEIR BESTOWAL.—1. By direction of the President the following decorations and insignia are authorized:

(a) Distinguished-service cross.

A bronze cross of appropriate design and a ribbon to be worn in lieu thereof, to be awarded by the President, or in the name of the President, by the commanding general of the American Expeditionary Forces in Europe to any person who, while serving in any capacity with the army, shall hereafter distinguish himself or herself, or who, since April 6, 1917, has distinguished himself or herself, by extraordinary heroism in connection with military operations against an armed enemy of the United States under circumstances which do not justify the award of the medal of honor.

Service Medal and Chevrons.—(b) Distinguished-service medal.

A bronze medal of appropriate design, and a ribbon to be worn in lieu thereof, to be awarded by the President to any person who, while serving in any capacity with the army, shall hereafter distinguish himself or herself, or who, since April 6, 1917, has distinguished himself or herself by exceptionally meritorious service to the government in a duty of great responsibility in time of war or in connection with military operations against an armed enemy of the United States.

(c) War-service chevrons.

A gold chevron of standard material and design, to be worn on the lower half of the left sleeve of all uniform coats, except fatigue coats, by each officer and enlisted man who has served six months in the zone of the advance in the war, and an additional chevron for each six months of similar service thereafter. Officers and enlisted men of the Aviation Service on combat-flying duty in Europe will be credited for the war-service chevron with the time they may be on duty.

The Wound Chevron.—(d) Wound chevrons.

A gold chevron of pattern identical with that of the war-service chevron, to be worn on the lower half of the right sleeve of all uniform coats, except fatigue coats, by each officer and enlisted man who has received, or who may hereafter receive, a wound in action with the enemy which necessitates treatment by a medical officer, and an additional chevron for each additional wound; but not more than one chevron will be worn for two or more wounds received at the same time. Disablement by gas necessitating treatment by a medical officer shall be considered to be a wound within the meaning of this order.

Medals of Honor in France.—2. During the present emergency, whenever a recommendation for the award of the medal of honor reaches the commanding general of the American Expeditionary Forces in Europe, he is authorized to cable his recommendation for immediate action and to hold the papers until a reply is received. In the event that his recommendation is approved, he will note the action taken in his indorsement when forwarding the papers in the case and will present the medal to the recipient as the representative of the President, or will delegate a suitable officer to act in that capacity.

In any case where the person recommended for the award of the medal of honor is at the time of the recommendation apparently fatally wounded or so ill as to endanger his life, the commanding general of the Expeditionary Forces in Europe is authorized to act immediately upon the recommendation as the representative of the President, afterwards reporting his action by cable.

3. Whenever a recommendation for the award of the medal of honor is approved by cable, and whenever a report is received announcing the award of the distinguished-service cross by the commanding general of the American Expeditionary Forces in Europe, and whenever the distinguished-service medal is awarded, such award, with a statement of the circumstances in each case, will be announced in general orders of the War Department by the adjutant general of the army without unnecessary delay.

May Be Posthumously Awarded.—4. The distinguished-service cross and the distinguished-service medal may be awarded posthumously to persons killed in the performance of acts meriting such award or to persons whose death from any cause may have occurred prior to such award. The medal so awarded will be issued to the nearest relative of the deceased person.

5. No individual will be entitled to more than one distinguished-service cross or one distinguished-service medal, but each additional citation in War Department orders for conduct or service that would warrant the award of either of these decorations will entitle the person so cited to wear upon the ribband of the decoration and upon the corresponding ribbon a bronze oak leaf of approved design, and the right to wear such oak leaf will be announced as a part of the citation. Other citations for gallantry in action published in orders issued from the headquarters of a force commanded by a general officer will be indicated in each case by a silver star three-sixteenths of an inch in diameter worn upon the ribband of the distinguished-service cross and upon the corresponding ribbon.

Forwarding of Recommendations.—6. Recommendations for the award of the distinguished-service medal will be forwarded to the adjutant general of the army through regular channels.

7. When an officer or enlisted man is admitted to a hospital for treatment of a wound, or when an officer or enlisted man is treated for a wound without being admitted to a hospital, the commanding officer of the hospital, or, in the latter case, the medical officer who treats the wound, will furnish the commanding officer of the wounded person with a certificate describing briefly the nature of the wound and certifying to the necessity of the treatment. This information may be furnished to commanders of higher units in the form of certified lists, and will be transmitted by them to the commanding officers concerned.

8. Commanding officers will forward to the adjutant general of the army, through military channels, lists in duplicate of those officers and enlisted men of their commands who have been honorably wounded in action, with a statement in the case of each individual, showing time and place wounds were received and organization in which they were then serving. Whenever a report is made of an action, it will be accompanied by the above-described list, and by certified copies of the medical officers' statements described in paragraph 7.

Granting Rights to Wear.—9. Upon receipt of lists of wounded the commanding general of the American Expeditionary Forces in Europe is authorized to grant the right to wear the wound chevron to the persons concerned, and he will note his action by indorsement in forwarding the papers.

10. The right to wear the wound chevron shall be confined to those who are authorized to do so by letter from the adjutant general of the army or from the commanding general of the American Expeditionary Forces in Europe.

11. The war-service chevron and the wound chevron shall be as described in paragraphs 13½ and 84½, Special Regulations No. 42 (Uniform Specifications) (see Changes No. 2); will be worn as described in paragraph 74½, Special Regulations No. 41 (Uniform Regulations) (see Changes No. 2); and will be furnished as directed in sub-paragraph 6 of paragraph 66, Compilation of General Orders, Circulars and Bulletins, War Department, 1881-1915.

Verifying Rights to Wear.—12. Requests for the issue or purchase of these chevrons will be accompanied by a list of the persons for whom they are desired, for the information of the commanding officer who authorizes the issue. The officer, before approving a requisition or a purchase, will verify the right of the persons concerned to wear the chevrons requested. Requests for authority to wear the wound chevron on account of wounds received prior to the present war will be forwarded with all available evidence to the adjutant general of the army for verification through the War Department records and appropriate action.

13. Section XI, General Orders No. 134, War Department, 1917, is rescinded.

(210.5, A. G. O.)

By order of the Secretary of War:

JOHN BIDDLE,
Major General, Acting Chief of Staff.

Official:
H. P. MCCAIN,
The Adjutant General.

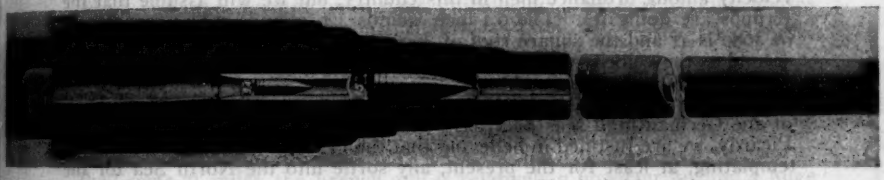
ORDNANCE AND GUNNERY

VELOCITY AND RANGE OF GUNS, II.—*How Super-Range Can Be Secured with Existing High-Powered Rifles.*—By J. Bernard Walker.—In an article on "Velocity and Range of Guns," three different methods of securing extreme range were considered—namely, a gun using a compound shell, a gun using a sub-caliber shell, and a gun of standard type, but with a large powder chamber and extremely long barrel.

As regards the compound shell, it was shown that, because of gyroscopic action the inaccuracy would be so great as to render the gun useless. In addition to that fundamental difficulty, the structure of each super-caliber shell would have to be made of such thickness and strength to resist the bursting stresses of the firing charge that each successive shell would be of very greatly reduced diameter, and the final, explosive shell that was intended to complete the trajectory would be so small as to be useless even for bombarding purposes. If the final shell were to be of any serviceable

size, such as 8 to 10 inches, the diameter of the compound shell, as assembled for firing, would be so great as to require the construction of a gun far exceeding in weight and length the heaviest artillery of the present day. In addition to the great thickness necessary in the wall of each shell, to enable it to act as a gun for the shell within it, there would be the difficulty of the large powder spaces required to give the desired velocities. These powder chambers, if we can call them that, would be so large that the compound shell would be of an absolutely prohibitive total length. In this connection, the space required for the powder charge of one of the most powerful guns in existence is very significant. The cartridge for this particular gun is nearly 18 inches in diameter, weighs about one-third of a ton, and is no less than 10 feet in length. So we are safe in stating that no practical gunmaker will ever attempt to construct a long-range gun upon this principle.

Another problem that would have to be solved is that of providing a reliable time fuse for firing the successive shells at the desired point in the trajectory. The elevations attained by the shells of anti-aircraft guns are moderate compared with those which the shells of a 75-mile range gun must attain. Yet great difficulty has been experienced in providing fuses



A 15-INCH 50-CALIBER KRUPP NAVAL GUN, SUB-CALIBERED TO 9.4 INCHES.

It is understood that the Germans are utilizing some 15-inch guns, built for their latest battleships, for bombarding Paris. This is done by inserting a liner (shown above in white) and boring it to take a 9.4-inch shell. Krupp claims for the 15-inch shell a velocity of 3100 foot-seconds. With a full charge of suitable powder the 9.4-inch shell would have a velocity of 6200 foot-seconds. In the drawing the liner is broken away and a 15-inch shell inserted for comparison.

that will function reliably at the extreme ranges of anti-aircraft weapons; although since the outbreak of the war, the efforts of many inventors have been directed to the problem. The rate of burning of a time fuse depends greatly upon the density of the air. The irregular density of the atmosphere at the summit of the trajectory of high-angle fire howitzers and anti-aircraft weapons is a condition that has greatly complicated the calculations of the artillerist.

Secondly, as regards the use of a sub-caliber shell in a large-caliber gun, while it is true that the velocities vary inversely as the square root of the weight of the shells, and, as has been shown in the case of a 16-inch howitzer, it would be possible to secure high velocity with existing guns, it has not been possible to provide a cradle that will stand up under the enormous pressures and the severe torsional stresses to which it is subjected. Furthermore, great difficulty has been experienced in releasing the shell from its cradle, and the flight of such shells has proved to be extremely erratic.

The third method suggested, namely, that the Germans had built an entirely new gun with large powder chamber and possibly 100 calibers of length, is the most reasonable proposition of the three; but since the article referred to was written we have learned on good authority that the Germans

have not built a special gun, but have made use of some of the new 15-inch 50-caliber guns which the Krupp works have built for one of the latest German battleships. It is stated that two or three of these guns have been sub-calibered by inserting a tube for the full length of the bore, so as to make it possible to use a smaller shell, having behind it a very large charge of powder, and driven through an exceptionally long path down the bore. As to the size of the sub-caliber shell, reports from Paris are contradictory—some stating that an 8.8-inch shell is being used and others a 9.5. The ordnance tables of the Krupp works include an 8.2-inch gun and a 9.4-inch gun. It is probably that the 9.4-inch shell is employed.

It would be perfectly feasible to heat the gun and insert a liner having an external diameter slightly larger than the bore of the gun (15 inches), and secure it firmly in position by the well-known method of shrinkage. The tube could then be bored to 9.4 inches and rifled. In this case the enormous charge for a 15-inch gun would be available for driving a 9.4-inch projectile through a gun that was 80 calibers long. Of course, it would be necessary to design a quicker-burning powder, in order to make sure that the whole charge was burned before the shell left the muzzle. The 15-inch shell weighs 1680 pounds, and according to the Krupp tables it has a muzzle velocity of 3100 feet per second (there is much skepticism as to this high velocity among ordnance men in this country, but we will assume that the Krupps are doing it). The 9.4-inch weighs 420 pounds. The square root of 1680 is 41 and the square root of 420 is 20.5, and accepting 3100 feet per second as the velocity of the heavier shell, we get a velocity for the 9.4-inch shell of 6200 feet per second.

If it be true that some of the guns built for one of the latest battleships of the German high seas fleet have been diverted to the German front in Picardy, we are justified in believing that the German Admiralty is not contemplating, at least for the present, any sortie into the North Sea for the purpose of breaking the blockade.

If it were possible to construct a cradle that was sufficiently strong to stand up to its work, and that would disengage itself from the shell without affecting the flight of the latter, it would be possible to fire a larger and more destructive shell than the 9.4-inch shell now being thrown into Paris. Take, for instance, our new army 16-inch gun, which is designed to fire a 400-pound projectile with a velocity of 2700 feet per second. If a 12-inch projectile weighing, with its cradle, 1100 pounds, were fired from this gun, it would be found by the formula referred to above, that the shell would have a velocity at the muzzle of about 4000 feet per second.

The possibilities in the direction of super-range, even greater than that obtained by the German gun, were made the subject of study by the Bureau of Ordnance of the Navy, and a design was drawn up for a gun which would give ranges far superior to that attained by the gun now firing upon Paris. The study of the problem, however, was merely an academic one; for our ordnance officers realize that such a gun has no tactical value, and they know that the United States will never so far depart from its standards of civilized warfare as to bombard indiscriminately the inhabitants of a great city.—*Scientific American*, 27/4.

THE LONG-RANGE GUN.—The following particulars of the long-range guns, and their projectiles, which are bombarding Paris, are given by *Le Génie Civil*. The shell is about 210 mm. in diameter, and its real length not more than half a meter, but it is lengthened by a false nose of sheet-metal, which increases the length to about 900 mm. It has a fuse at the base, and, possibly, one also at the nose, to double the chances of a burst. As a matter of fact, not a single unexploded shell has yet been found. It has two copper driving bands, between which are two bands in the steel, cut with rifling grooves. Its weight is between 100 and 120 kilos. The thickness of the walls being between 30 and 40 mm., the internal capacity is no more than 6 liters, sufficient for only 10 to 11 kilos of high explosive.

From this fact it results that the shell is broken into few pieces, and the fatalities caused by it are relatively small.

The initial velocity of the projectile must be between 1200 and 1400 meters per second, and our contemporary recalls that 20 years ago a gun of 164.7 mm. was constructed at the National Foundry at Rouelle, and was fired with a pressure of 2800 kilos per square centimeter, and gave a muzzle velocity of 1200 meters per second. Its length was 90 calibers. It was only tested at low angles of elevation, and not for maximum range. It is shown by an expert artillerist, who writes for the *Génie Civil*, that the problem turns largely upon the selection of a very slow burning powder, so that a high pressure may be carried right up to the muzzle. It is pointed out that the wear of the gun, even though the maximum pressure does not exceed that usually employed, is likely to be very rapid. The gun is assumed to be 110 calibers long, the charge 183.6 kilos, and the maximum pressure 2500 kilos per square centimeter, say, 15 tons per square inch.—*Engineer*, 12/4.

WILL BUILD 100-MILE GUN.—Connecting Mr. Gary's announcement with the *Herald* despatch of several days ago in connection with the new large U. S. gun plant, it was recalled in the financial district that reports had been current of a new super-gun which the government had been testing and which had been manufactured near Philadelphia. Several banking houses learned that the new gun, which then had passed two tests, was expected to have a range of a hundred miles.—*N. Y. Herald*, 10/5.

THE CREUSOT 520-MILLIMETER WEAPON—THIS WAR'S MOST POWERFUL GUN.—The recent publicity given the long-range German gun has quite overshadowed the French 520-millimeter gun, which, after all, remains the most powerful gun now in use. Whereas, the German piece throws its shell some 75 miles, the French gun is relatively a howitzer hurling a huge shell a comparatively short distance. Practically speaking, it is a fort wrecker of proved powers.

For some time there had been rumors of a 520-millimeter gun employed by the French artillerists, but ordnance experts and others familiar with the difficulties in the way of producing such a powerful piece of mobile artillery did not place much credence in the unofficial descriptions; they preferred to wait for some definite evidence.

It was not until the French official films presented the 520-millimeter gun to American audiences that ordnance experts and others were convinced that the huge mobile howitzer was a *fait accompli*. The accompanying photographs which have recently reached this country show one of these huge guns receiving the final touches at the Creusot works in France, and another similar gun in action. It appears that the gun is a howitzer mounted on a railroad carriage, and fires a shell measuring 20.47 inches in diameter. As a fort wrecker, this gun is undoubtedly without peer, the German 420-millimeter and the Austrian 300-millimeter howitzers having been outdone by a good margin. During the French attack on Fort Malmaison it is reported that a single 520-millimeter shell crumbled this permanent fortification upon which the Germans had spent so much time and labor.—*Scientific American*, 4/5.

During the past year the latest type of naval 16-inch gun was completed for our new battleships; it throws a projectile weighing 2100 pounds.—*Official Bulletin*, 30/4.

U. S. STEEL TO BUILD BIGGEST OF GUN PLANTS.—The largest ordnance and munitions plant in the world, probably surpassing in capacity the Krupps and the Bethlehem work combined, is to be built for America by the United States Steel Corporation.

Elbert H. Gary, chairman of the board of the corporation, made a formal announcement yesterday that it had undertaken the construction of such a plant "at the solicitation of the Secretary of War," confirming a despatch from the *Herald's* bureau in Washington several days ago that the Secretary of War had asked for $4,000,000,000 for the construction of an ordnance plant by the steel corporation.

In that despatch it was explained the great sum was to be used solely for the construction of the plant, and that among the "big gun" products would be a super gun of astonishing range, "greater than any yet used," and that it would be manufactured in very large quantities.

Mr. Gary's Statement.—The statement issued by Mr. Gary follows:

"At the solicitation of the Secretary of War, the United States Steel Corporation has undertaken to construct and equip for and at the expense of the government upon a site to be located in the interior of the country a plant for the manufacture of cannon and projectiles of large sizes and in great quantities and to operate the same when finished.

"At best the time required will extend over a considerable period and the cost will be large, but the work will progress with all practicable speed and economy in the use of money will be practised. It is hoped and expected the results will be creditable to the country.

"The work will be in the immediate charge of a committee consisting of a vice-president and the controller of the corporation and eight others designated from the officers (presidents or vice-presidents) of the various manufacturing subsidiary companies, and all selected because of their education, experience and peculiar fitness. This committee will keep in close touch with the building and operating organization which is being formed, and with the officers of the Steel Corporation and with the War Department.

"Officers of the corporation and of subsidiary companies will receive no compensation for their services.

"Accurate books of account will be kept which, with all records, files and other documents and papers, will be open and subject to examination by government officials or other properly appointed representatives.

"General plans are being rapidly prepared and will soon be ready for examination by the Ordnance Department or other bureau, and when approved, the corporation will be given a free hand in construction and operation, holding itself responsible for the faithful performance of the duty imposed by the terms of the contract.

"The corporation, in consequence of the magnitude of its business, most of which, directly or indirectly, is in aid of the military necessities of the government and its allies, had hoped to avoid the necessity of engaging in work of the kind now entered upon, but was persuaded by the War Department that it was imperatively required under existing conditions."

To Turn Out Big Guns.—At Washington last night the War Department issued the following statement:

"The Secretary of War has entered into an arrangement with the United States Steel Corporation by which that corporation undertakes to construct and equip, for the government, a modern ordnance plant, upon a site located in the interior of the country, to be selected.

"A committee formed from officers of the corporation and its subsidiary companies, men fitted by education and experience, will be in immediate charge of the work. These men will receive no compensation for their services. The plant is to be built, equipped and operated at the expense of the government of the United States Steel Corporation without profit. Cannon of the largest calibers will be manufactured, as well as heavy projectiles in large quantities.

"While the United States Steel Corporation, like other steel manufacturers, is full of work and has always gladly undertaken production of finished materials wanted by the government, it was persuaded by the

Secretary of War to undertake this additional task, which it patriotically agreed to do, and has placed its best energies and the strength of its economic position at the disposal of the War Department."

Probably Near Pittsburg.—Neither the Steel Corporation nor the government was prepared to say where the great plant would be built nor exactly what it would produce, but it is understood in circles close to those at work on the project that the plant will be near Pittsburg and that it will produce field and coast defence guns of the largest caliber and shells for them.

That the plant is to be much larger than any other in the world is indicated by the request of the Secretary of War for Congress to provide $4,000,000,000 to pay only the cost of construction.

Soon after the start of hostilities in Europe Mr. Gary announced the Steel Corporation would not enter the munitions field, but would content itself with supplying steel and other of its products to the Allies and to domestic consumers. Mr. Gary at that time, however, promised that in the event of the United States being drawn into the war the United States Steel Corporation would be prepared to place its entire facilities at the disposition of the government.

It was recognized in the steel trade that if those facilities were made available for gun making purposes, the Steel Corporation could easily outdo all other ordnance making plants in the world. The arrangement between the United States Steel Corporation and the government is regarded as being in line with Mr. Gary's promise.

Bethlehem Is Largest.—At present the largest ordnance plant in this country is that of the Bethlehem Steel Corporation. At the head of that company is Charles M. Schwab, Director General of the United States Emergency Fleet Corporation, who was the first president of the United States Steel Company.

Another large American ordnance plant is owned by the Midvale Steel and Ordnance Company, of which William Ellis Corey, who succeeded Mr. Schwab as president of the United States Steel Corporation, is the head.

Since war began the Bethlehem plant has been expanded to an extent that placed it ahead, according to its managers, of the Krupp works in Germany.

The new plant to be built by the United States Steel Corporation will be ready, it is expected, to start work in about 12 months.—*N. Y. Herald*, 10/5.

NEW TRENCH ENGINES ARE USED BY GERMANS.—A new model "minenwerfer," the terrible trench engine which hurls through the air without noise of discharge and with no other warning than a slight whizzing sound missiles charged with high explosives, has appeared in the German trenches. It is called the "flugelminenwerfer" and heaves a 24-cm. projectile, which weighs 212 pounds and is guided by four wings attached to the sides, any distance up to 1200 meters.

There are also other new models of "minenwerfers," heavy, medium and light. This weapon is very popular with the Germans for trench fighting, although the new regulations allow each battalion of infantry only four light pieces, instead of eight, as heretofore. The "minenwerfer" crews belong to the pioneer companies, are commanded by artillery officers and operate in strict connection with the infantry regiments. Infantrymen dislike exceedingly to see a "minenwerfer" take up position in their trench, for it means invariably a heavy reciprocal bombardment as soon as a few shells are fired. The "minenwerfer" operators cannot claim to belong to the most popular branch of the army.

The chapter of "minenwerfers" in the new German rulebook, "Regulations Governing Trench Warfare," is very instructive. Directions are given to divide carefully all missions between the artillery and the "minenwerfer," taking into account the possibilities of each arm and the end to be attained. "Minenwerfers" should be used in place of artillery every time

it is possible for short range destructive fires, barrages, annihilation fires and for worrying the enemy, as thereby considerable economy is realized. It is insisted that they be used for accompanying assaulting troops.

The information received concerning the number and location of the German aviation schools is rather contradictory. In addition to the army instruction camps, it is probable that each of the big aeroplane factories has a special school for pilots attached to it, where machines are tried out and put in shape and where student pilots come to begin their apprenticeship. The instruction of pilots is carried out in the interior of Germany. It is begun at an aviation school (military or civilian) and is completed at a depot escadrille.

Observers are trained in the schools of the interior of Germany or at the aviation parks in northern France. The training consists of conferences on tactics and technics and practical exercises. Conferences deal with the German and enemy aviations, wireless telegraphy, artillery fire regulating, aerial photography, weather service, flying by the compass and the stars, writing up of reports, etc.

The practical exercises include flights with and without tactical missions (profiting by the movements of troops which may be going on in the neighborhood), exercises in machine-gun firing at targets on the ground and exercises in aerial combat. During these combats, which last at least 15 minutes, the aeroplane attacked and the assailant machine photograph each other, which permits a later study to be made of the nature and usefulness of the maneuvers prescribed to the pilot by the observer.

The bomb throwers receive a special instruction. The student takes his seat in an elevated fuselage and, using a sight, drops arrows on an endless chain about 10 yards long and of a certain width, on which is painted a landscape and which moves under him at varied quicknesses.—*Evening Star*, 30/4.

GUNS COMPARED WITH TORPEDOES.—If the total losses among warships sustained by all the belligerents in the last three and a half years be reckoned up it will be found that the majority have been caused by torpedoes and mines. Gun-fire has accounted for comparatively few. Yet it would be erroneous to conclude from these figures that either the torpedo or the mine is a more formidable weapon than the gun. For obvious reasons, the record of the torpedo impresses the imagination of the non-technical public, and, doubtless, to many people the U-boat would be a more appropriate symbol of modern naval power than the battleship. But naval officers, with few exceptions, are convinced that the gun remains the supreme and decisive instrument of naval combat. And it is not difficult to show why this should be so. Within the past decade the science of under-water attack has certainly made remarkable progress. At the outbreak of the war the latest torpedoes were credited with a range of 10,000 to 12,000 yards, and with the power of traveling a distance of 3000 yards at a velocity of 45 to 50 knots. At the same time the explosive charge contained in the warhead had been so increased that a single hit was expected to prove fatal to anything afloat. No wonder, therefore, that the torpedo was viewed with respect, or that its influence led to drastic modifications in both strategy and tactics.

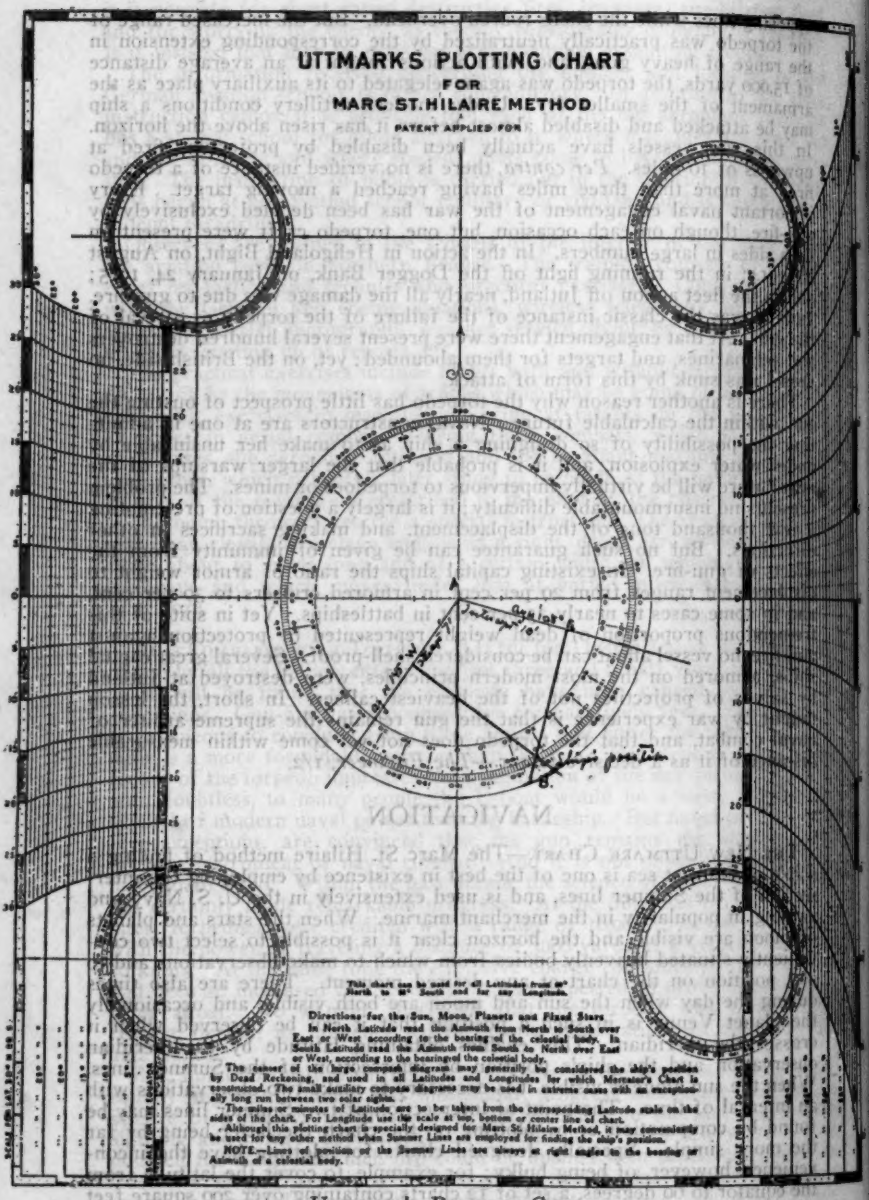
But, simultaneously with this great advance in the power of the torpedo, equally important, though less spectacular, progress was being made in the science of gunnery. Improvements, not so much in the gun itself as in sighting and control appliances, had in the course of a few years almost doubled the range at which fire could be opened with precision. Had the "decisive range" remained at 8000 yards, which was the distance most generally accepted, the torpedo would undoubtedly have been a most formidable factor, for, as its own range was well above this figure, it might have been employed with deadly effect by battleships against battleships, and shoals of torpedoes would have been racing through the water between the

opposing lines while the shells roared overhead. But the increased range of the torpedo was practically neutralized by the corresponding extension in the range of heavy guns, and, with actions fought at an average distance of 15,000 yards, the torpedo was again relegated to its auxiliary place as the armament of the smaller fry. Under modern artillery conditions a ship may be attacked and disabled almost before it has risen above the horizon. In this war vessels have actually been disabled by projectiles fired at upwards of 10 miles. *Per contra*, there is no verified instance of a torpedo fired at more than three miles having reached a moving target. Every important naval engagement of the war has been decided exclusively by gun-fire, though on each occasion, but one, torpedo craft were present on both sides in large numbers. In the action in Heligoland Bight, on August 28, 1914; in the running fight off the Dogger Bank, on January 24, 1915; and in the fleet action off Jutland, nearly all the damage was due to gun-fire. Jutland was the classic instance of the failure of the torpedo as a rival of the gun. At that engagement there were present several hundred destroyers and submarines, and targets for them abounded; yet, on the British side, no vessel was sunk by this form of attack.

There is another reason why the torpedo has little prospect of ousting the gun within the calculable future. Naval constructors are at one in admitting the possibility of so designing a ship as to make her unsinkable by under-water explosion, and it is probable that the larger warships of the near future will be virtually impervious to torpedoes or mines. The problem presents no insurmountable difficulty; it is largely a question of pre-empting a few thousand tons of the displacement, and making sacrifices in other directions. But no such guarantee can be given of immunity from the effects of gun-fire. In existing capital ships the ratio of armor weight to displacement ranges from 20 per cent in armored cruisers to 30 per cent, and in some cases to nearly 35 per cent in battleships. Yet in spite of this tremendous proportion of dead weight represented by protection against gun-fire, no vessel afloat can be considered shell-proof. Several great capital ships, armored on the most modern principles, were destroyed at Jutland by salvos of projectiles not of the heaviest caliber. In short, the lesson taught by war experience is that the gun remains the supreme arbiter of naval combat, and that the torpedo does not yet come within measurable distance of it as a decisive factor.—*The Engineer*, 1/2.

NAVIGATION

THE NEW UTTMARK CHART.—The Marc St. Hilaire method of finding a ship's position at sea is one of the best in existence by employing the intersection of the Sumner lines, and is used extensively in the U. S. Navy and gaining in popularity in the merchant marine. When the stars and planets or moon are visible and the horizon clear it is possible to select two conveniently situated heavenly bodies from which to make observations and to plot position on the chart at any desired moment. There are also times during the day when the sun and moon are both visible, and occasionally the planet Venus is in such a position that it can be observed when it crosses the meridian. This enables obtaining latitude by the meridian observation and the ship's position by intersection of the Sumner lines. When the sun alone is visible it is necessary to make two observations with an interval of time. The point of intersection of two Sumner lines may be found by computation or by plotting on the chart, the latter being by far the more simple. Specially designed charts for plotting have the inconvenience, however, of being bulky; for example, to cover the latitude from the equator to 60 degrees, a set of 12 charts containing over 200 square feet of paper have been in use for many years. This difficulty is now obviated by Uttmark's plotting chart, invented by Captain F. E. Uttmark, of Uttmark's Nautical Academy, 8 State Street, this city. This chart covers all latitudes from 60 degrees north to 60 degrees south, and all longitudes.

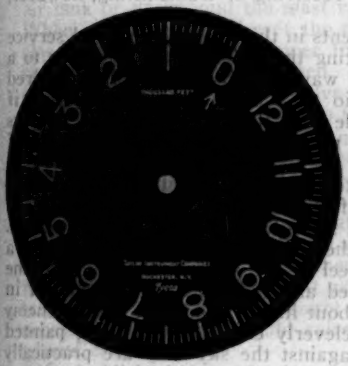

UTTMARK'S PLOTTING CHART
FOR
MARC ST. HILAIRE METHOD
PATENT APPLIED FOR
This chart can be used for all Latitudes from 80° North to 80° South and for any Longitude.
Directions for the Sun, Moon, Planets and Fixed Stars
In North Latitude read the Azimuth from North to South over East or West according to the bearing of the celestial body. In South Latitude read the Azimuth from South to North over East or West, according to the bearing of the celestial body.
The center of the large compass diagram may generally be considered the ship's position by Dead Reckoning, and used in all Latitudes and Longitudes for which Mercator's Chart is constructed. The small auxiliary compass diagrams may be used in extreme cases with an exceptionally long run between two solar sights.
The miles or minutes of Latitude are to be taken from the corresponding Latitude scale on the sides of the chart. For Longitude use the scale at top, bottom or center line of chart.
Although this plotting chart is specially designed for Marc St. Hilaire Method, it may conveniently be used for any other method when Summer Lines are employed for finding the ship's position.
NOTE.—Lines of position or the Summer Lines are always at right angles to the bearing or Azimuth of a celestial body.

UTTMARK'S PLOTTING CHART.

—*Marine Journal*, 4/5.

It is less than 1 square foot in area, has a scale of 6 inches to 1 degree of longitude, as compared with a scale of 4 inches to 1 degree of longitude on the former charts, and is therefore 50 per cent more efficient than the scale on the plotting chart published by the U. S. Hydrographic Office. Captain Uttmark's chart may be used for plotting ship's position by any method using the Sumner lines.

MARVELITE, A NEW ELEMENT OF SAFETY FOR SHIPS IN THE SUBMARINE ZONE.—Under present conditions at sea there are times when a light on the bridge of a ship may have fatal consequences, revealing the location of the ship to the lurking submarine. But the telegraph, the compass, the zig-zag clock and other instruments must be visible to the navigator, and heretofore lights of some sort have been absolutely necessary. This source of danger has now been overcome by the application of marvelite to the dials of these instruments. Marvelite is a luminous compound, made with radium, which makes the dials clearly readable in the dark to anyone



ALTIMETER DIAL.

WET COMPASS DIAL.

standing near them, but does not give off light enough to be seen many feet away.

It has been used for some time on clocks, watches, compasses, and by the United States Government on barometers, altimeters and other instruments of the Signal Corps and the navy.

The manufacturers of marvelite (Cold Light Manufacturing Company, 558 West 158th Street, New York) have recently solved the problem of applying their material to wet compasses, so that it resists the action of alcohol or other fluids in which the dial floats. It is also used on the dial of the log.

There are various kinds of luminous materials, but only those containing radium will stand the test of time. Marvelite is permanently luminous for all practical purposes. The Cold Light Manufacturing Company secures its radium from the Schlesinger Radium Company (its parent company), one of the largest producers of pure radium in the world; and the honor and reputation of both companies are placed squarely back of the statement that marvelite is made with radium, which is the sole source of its luminosity.

There are so many uses for this material that have not yet been developed that the company maintains an experimental laboratory for the purpose of working out problems that are presented to it.—*Marine Journal*, 4/5.

RADIO

THE UNITED STATES NAVAL COMMUNICATION SERVICE operates all radio service; 5000 youths are studying radiotelegraphy at two naval schools.—*Official Bulletin*, 30/4.

HOW U-BOATS SEND WIRELESS MESSAGES 1000 MILES.—B. H. Winfield Secor.—The Germans have developed submarine radio-communication to a fine art—they had to. This is so for obvious reasons, chief among which is that the success of the U-boat campaign depends to a large extent on keeping in wireless communication with the individual sub-sea-boats and the possibility of certain of their number transmitting intelligence to the nearest land base.

At first the submarines made use of folding or telescopic masts which did not elevate the radio antenna very far above the deck—not more than 20 to 30 feet in most cases. For ordinary inter-communication between submarines this collapsible antenna served its purpose admirably. Where long ranges were to be negotiated, either in receiving or transmitting, however, it became a real problem.

One of the latest Teutonic improvements in this arm of the naval service is the utilization of balloons for elevating the U-boats' antenna wire to a height of 1000 feet and more. In this way vast distances can be covered and valuable intelligence sent by radio to a second relay submarine if necessary, so that it is not improbable that the news of ships' sailings from American ports could have been radioed to Germany by the aid of three or four U-boats.

The balloons, two in number, and fastened to a rigid equilibrium member, carry up the antenna wire to a height of several thousand feet if necessary. The antenna, at its base, is wound on a special electric-motor driven drum. This drum is instantly controlled by the throw of a switch, so that if a ship comes into view it can rapidly reel in the balloon antenna and the balloons are taken inside, hatches closed and the craft submerged—all in almost less time than it takes to tell about it. It is difficult for an enemy ship to see the balloons, as they are cleverly camouflaged, being painted partly white and partly blue, so that against the sky they are practically invisible. The antenna wire is, of course, quite fine and invisible at even a short distance away.

It has been a mooted question for some time as to just how far such a radio-equipped sub-sea fighter could send a message. The receiving range with such a balloon suspended aerial is easily several thousand miles, using modern amplifiers and other refinements in the radio art. The writer asked several well-known radio experts their opinion on the possible sending and receiving activity of a balloon-aerial equipped U-boat and they practically all agreed with the ideas expressed by Mr. F. H. Kroger, chief engineer of one of the leading American radio companies, that, with fair weather conditions, and with the proper radio transmitting apparatus tuned to a high wave length, it would be possible for the submarine to send a wireless message 2000 miles, and possibly 3000 to 4000 miles under extremely favorable conditions. The transmitting set used might, of course, be a special one rated at 15 to 25 kilowatts.

If the sub-sea-boat wanted to transmit an important message she would in all likelihood choose the night-time. She could then emerge and fly her balloon aerial with reasonable safety. And for a long-range message requiring as much energy as mentioned above, it should be remembered that there is available all the engine power required. All that would have to be done would be to connect up the high capacity dynamo to these engines, and this in turn to the special high-power radio transmitter. Such a set, including the dynamo, would not occupy such a large space as might be imagined off-hand. Also the newer U-boats are vertiable submarine-cruisers, several hundred feet in length, which, of course, gives a much greater space for the radio equipment.

Many ingenious folding and other types of masts have been perfected for medium and short-range radio work on the submarine. An interesting practical telescope mast was patented by a Yankee inventor several years ago. The inventor, Mr. Joseph Raes, covered several modifications of the basic idea in his patent. In one type a continuous flexible metal cable is used. When a pull, as produced by a motor, is applied to the lower end of the cable, it causes all of the sliding telescopic members to be elevated. The upper end of the cable is secured to the bottom of the top telescopic member. When pressure is removed on the cable the mast descends by gravity.

A similar type telescopic mast has the individual sections raised and lowered by a clever arrangement of gears and shafts. This elevating scheme would be considerably slower than the pervious cable-operated type.

The author suggests herewith a pneumatic telescopic radio mast. This is similar in principle to the pneumatic (compressed air) lifting cranes used in manufacturing plants, foundries, etc. With the proper pressure of compressed air, it is only necessary to close the suction blower pipe valve, open the high pressure air valve attached to the pipe line from compressed air tank or flasks, and the mast rises up by expansion of the air within it. When it is desired to lower the mast quickly, the compressed air valve is closed and the suction blower line valve slowly opened; the air is thus removed and the mast collapsed. Ordinarily, no suction would be required to lower the mast; merely a valve opening to the atmosphere through which the compressed air could rush to the outer air.

An ingenious collapsible radio mast was invented in Germany some years ago, and several of them have been used in this country. It was, perhaps, the lightest ever designed thus far—possibly too light for submarine requirements—but it possessed the element of speed. It employed four flexible strips of metal rolled on drums at the base. These strips were notched on both edges, and when the handle was turned the four notched strips of thin steel intermeshed with each other, making a lock-cornered square tubular mast about 8 inches square. It was found possible to raise a platform containing two men on it to a height of 80 feet for observation purposes when necessary. Two men could raise the mast in a short time by turning a geared crank handle.

An interesting feature not generally known is that submarines are now fitted with submarine telegraph apparatus, which operates by means of sound waves sent through the water from powerful electric vibrators mounted on the hull of the submarine. Sensitive microphones suitably mounted on either side of the hull enable the commander to tell when a ship is approaching, even at a considerable distance, by the sound of her propellers, which is transmitted through the water.

Then there is the latest safety feature—the telephone buoy. If the submarine should sink and become unmanageable, the crew can pull a lever which releases the telephone buoy, which rises to the surface of the water. Any craft passing in the vicinity of the sunken sub-sea-boat can open this buoy and, by means of the telephone inside it, speak to the imprisoned crew. Submarines send out sound signals of distress through the water also, which may be intercepted by another or by a warship or steamer.—*Electrical Experimenter Magazine.—Baltimore Sun*, 28/4.

ENGINEERING

ELECTRIC WELDING IN PLACE OF RIVETING.—The proposal to use electric welding in place of rivets in securing the plating of a ship, is an attractive proposition if it can be done successfully, and we understand that tests which were recently made in the presence of the representatives of the Shipping Board have been so satisfactory that one of the engineers of the Emergency Fleet Corporation has been sent to Newark where the system

is to be tried on the 9500-ton ship which is about to be built by the Federal Ship Building Corporation of Newark, N. J. According to the dispatch, a low voltage is used and the current is applied to the metal through the ends of large forceps which press the sheets firmly together after the metal has become sufficiently heated to effect a weld.—*Scientific American*, 27/4.

METHOD OF TESTING LUBRICATING OILS.—Although it may not be possible to give an exact definition of the lubricating power of an oil nor to attempt to employ a method for measuring this important property, it is found that it is directly connected with viscosity. It is well known that the viscosity of liquids can be observed by the Poiseuille method, by measuring the rate of flow through a capillary tube, and making use of a suitable formula which takes account of the quantity of liquid delivered per unit of time, the radius of the section, length of the tube, and pressure on the oil, whence is obtained a coefficient representing the viscosity. This latter decreases rapidly as the temperature rises. In practice, comparison is made of the viscosity of the product under observation with standard types of oils by passing the oil through a tube at the same pressure and measuring the flow. It is of interest to make such tests at different temperatures, for in the case of an oil whose viscosity decreases too quickly when the temperature rises, there is danger that it will cease to lubricate when heating occurs.

At a recent meeting of the French Physical Society, M. René Dubrisay proposed a simple device for making tests upon lubricating oils, and it gives sufficiently exact results. He makes use of a pipette containing an upper and a lower bulb of about 2 c. c. each, joined by a straight portion. A short piece of tube projects above the upper bulb, upon which is fitted a piece of rubber tube with a pinch cock. Below the lower bulb is also a short length of tube for outflow of liquid. Near the rubber tube is an upper mark, A, and between the two bulbs the marks B and C. The pipette is plunged in oil and taken up full, the upper surface of the oil being made to coincide with the top mark A; the filled pipette is then dipped into a vessel of water and left until the temperature reaches an equilibrium. Then the pipette is held by means of a support so as to bring the lower mark C at the level of the surface of the water, and the cock is opened so as to let the oil flow out. The time in seconds is counted which is taken for the oil to descend from A to B. As the variations in density between different oils are slight, the pressures of flow are practically the same in all cases. Again, the temperature can be closely measured, and it is an easy matter to operate with a series of temperatures throughout a wide range.

The method has the following advantages: The outflow from the end is always visible. A uniform temperature is obtained in the whole mass at the start, and this does not vary appreciably during the experiment. However, it may be asked, since the outflow takes place in water, whether the results are comparable with those usually obtained, and whether the present measurements of viscosity have a practical value. But the author made a series of tests upon a number of common lubricating oils, first with the classical Barbey apparatus and then with the present simple method. The curves obtained in the two cases have practically the same appearance, and in both methods the oils are classified in the same order. From these tests, the value of the author's method appears to be established. One practical point to be noted is that the new device can be used to find out at what temperature the oil ceases to flow, under a uniform pressure, and this test will be of value in the case of oils which are used in cold weather for lubrication of mechanical parts working in the open air.—*Scientific American*, 27/4.

ENGINEERING RESEARCH ON AIR PUMPS BY THE NORTH-EAST COAST INSTITUTION OF ENGINEERS AND SHIPBUILDERS.—The important departure by the North-East Coast Institution of Engineers and Shipbuilders in ap-

pointing a committee of expert engineers to test apparatus offered by manufacturers and accepted by the Council has resulted in a very comprehensive report on the working of air pumps such as are used in connection with the condenser plant of steam engines. The manufacturers in this case were Messrs. Richardsons, Westgarth and Co., Ltd., and the tests were carried out at their Hartlepool works.

The report, presenting as it does authoritative and reliable data, should prove of great value to engineers, especially with reference to the production of high vacuum for steam turbines and to the more economical production of low vacuum for cargo vessels; it definitely marks the opening up by a scientific institution of a new and most valuable field of activity, and there can be little doubt that the example which the North-East Coast Institution has set will be followed in other parts of the country, so that, ultimately, organized scientific research in engineering and other branches of industry will become active and general instead of, as at present, passive and exceptional.

The investigations undertaken by the Institution will include air pumps of the reciprocating type and of the rotary and jet types. The present report deals with tests made on pumps of the reciprocating type only, and the point of chief technical interest is the fact that the tests have demonstrated that remarkable influence in the withdrawal of air from a condenser is possessed by a steam jet or a series of jets when used in combination with such pumps. The original conception of combining a steam jet with an air pump was due to Mr. James Atkinson, of London, who in 1886 proposed it in connection with the cooling of liquids under high vacuum. In 1902 it was developed by Sir Charles Parsons in his vacuum augmentor for use with steam engine condensers, and at later dates has been further considerably improved by Mr. D. B. Morison, of Hartlepool. These improvements, known as the kinetic system, are dealt with in the report, together with the "wet and dry" and other systems now in general use.

Special attention has been given to air pumps and condensers in recent years, which is primarily due to the influence of vacuum on the steam economy of turbines, an influence which is greater than is generally realized. For example, in the case of high-pressure turbines an increase in vacuum from 27 inches to 29 inches results, in a suitably designed turbine, in a gain in steam economy of 13 per cent, and in the case of exhaust steam turbines the same increase effects a possible saving of no less than 22 per cent.

According to present practice, there are many ways of withdrawing air from a condenser, as by reciprocating and rotary pumps and by steam and water ejectors, but in view of the general adoption of geared turbines for the mercantile marine as soon as conditions permit, authentic tests on any apparatus for the production of high vacuum which is so essential for the economy and efficiency of this system of marine propulsion, are of unusual value at the present time.

From a technical standpoint, the report demonstrates beyond question that no mechanical contrivance is so simple and so efficient as a steam jet for compressing a large volume of highly attenuated air through a small degree of compression, and, as is already well known to engineers, a reciprocating air pump is a very efficient means for discharging moderate volumes under a high degree of compression. Consequently, the correct solution of the problem of air discharge from a condenser is to withdraw a large volume of aerated vapor by means of one or more steam jets and compress it through the range of compression in which the steam jet works with very high economy and then pass it on at such an absolute pressure that an air pump or other device can discharge it to the atmosphere also with very high economy.

It is interesting to note that mainly with the production of high vacuum such as is required for steam turbines, the report makes it clear that, for

the production of low vacuum such as is standard for the reciprocating engines of cargo vessels, the jet system may be even more effective. From the standpoint of economy, the effects of the adoption of the jet system are evidently extremely valuable. As is well known, a reciprocating air pump is a highly important auxiliary on a steamship. Its cost depends on its size; its wear and tear on its speed of working; and its economy in operation on the quantity of steam that it uses. The report shows that for a given duty the combination of a steam jet on the Kinetic system will allow the speed of a given pump to be reduced from 60 strokes per minute to 20 and the consumption of steam to be reduced by one-third, the pump mechanism remaining exactly as at present. Alternatively and obviously, an independently-driven pump may be made smaller for a given duty, or, in the case of cargo vessels in which the air pump is driven by the main engines, the entire economic influence of the steam jet may be utilized in reducing the size of the main condenser and the pumps in connection therewith. Herein lies the present value of the report.

At no time in the industrial history of Great Britain have savings in the use of labor and of metals been of such paramount importance as now. Apart altogether from the technical value of the results obtained, the investigations just completed indicate how such savings can be made in the manufacture of a particular part of the equipment of a steamship. The lead given by the North-East Coast Institution in the matter of active research, with practical demonstration of how labor and material can be saved in manufacture, and, as in this case, higher efficiency can be obtained in operation, becomes, therefore, of national importance and should at once be followed by every engineering institution in the kingdom.

The committee appointed by the council to carry out the tests outlined above consisted of: Mr. Edwin Orde, of Messrs. Armstrong, Whitworth and Co., President of the North-East Coast Institution of Engineers and Shipbuilders; Dr. Morrow, M. Sc., of Armstrong College, the wel-known authority on steam turbines; and Mr. Waldie Cairns, M. Sc., Consulting Engineer, of Newcastle-on-Tyne.—*Page's Engineering Weekly*, 28/12/17.

METALLURGY OF FERRO CHROMIUM.—By R. J. Anderson.—Ferro chromium, like ferro silicon, was one of the pioneer alloys made in the electric furnace at the time when this appliance was first used for the manufacture of the ferro products. The use of chromium in alloy steels has markedly increased, and its employment promises to further increase on account of the special properties it confers upon the metal. Chromium steels are well adapted for use in the manufacture of armor plate and for armor-piercing projectiles, as well as for automobile parts, and in other cases where great hardness and high tensile strength are desired. In combination with nickel, chromium forms the now well-known chrome-nickel steel of the trade. Recently it has been employed with tungsten for magnet purposes.

Prior to the introduction of the high-temperature electric-melting furnace, the manufacture of ferro chromium was performed almost entirely in the blast-furnace stack, although a smaller amount was made in the crucible. Crucible manufacture gives high-tenor alloys, but several concomitant disadvantages are present. Only small charges can be fired at a time, the crucible cost is high, as special and expensive pots are required, and the alloys, though rich in chromium, are also comparatively high in impurities. The product is, therefore, not always satisfactory. For commercial purposes, the electric furnace affords a satisfactory appliance in which alloys high in chromium tenor and low in impurities can be smelted. The large quantities demanded in steel metallurgy for chromium steel production are now made in the electric furnace in the United States, Germany and elsewhere. The modern ferro chromium is a high-percentage alloy containing 60 per cent chromium or more, and the physical properties are a function of the amount of carbon present.

Only a small amount of ferro-chromium is made in the blast furnace at the present writing, for the reason that the electric furnace is more efficient where the power cost is low, and, further, the electric furnace turns out a better product. When ferro chromium is made in the blast furnace it requires a heavy fuel consumption for its successful manufacture; about three tons of fuel per ton of 40 per cent alloy are used. The modern method of making ferro chromium is in the electric furnace, although a lesser quantity is produced by the thermit method. Generally speaking, the iron-chromium alloy produced in the electric furnace analyzes about 60 to 65 per cent chromium and 5 to 9 per cent carbon.—*Page's Engineering Weekly*, 28/12/17.

SUBMARINES

U-BOAT DETECTOR DECLARED SOLUTION OF SUBMARINE PROBLEM.—Elimination of the submarine as a potent factor in warfare is predicted by George Harvey, editor of the War Weekly of the *North American Review*, in the current issue of that publication.

A new contrivance devised by American inventors and produced in this country is the instrument which bids fair to sweep the U-boat from the seas, or at least so to minimize its destructive powers that it will cease to be a material weapon, such as has carried on its piratical campaign since the beginning of the great conflict.

The invention apparently is the product of long experimenting, its function being to locate prowling undersea boats from a distance, thus preparing the larger vessels for the attack. The announcement by Mr. Harvey, printed under a Washington date, reads:

"We have the distinguished privilege and supreme satisfaction of announcing that the problem of locating the exact position of a submarine from a ship, at a distance which for obvious reasons cannot be mentioned, has been solved by American inventive genius. This is not a guess based upon experiment. It is a fact demonstrated by actual experience. While the contrivance does not presage the complete extirpation of the pest, it does virtually guarantee its ultimate elimination as a material force in piracy."

The War Weekly does not divulge the date of the discovery or the location of its first successful trial.

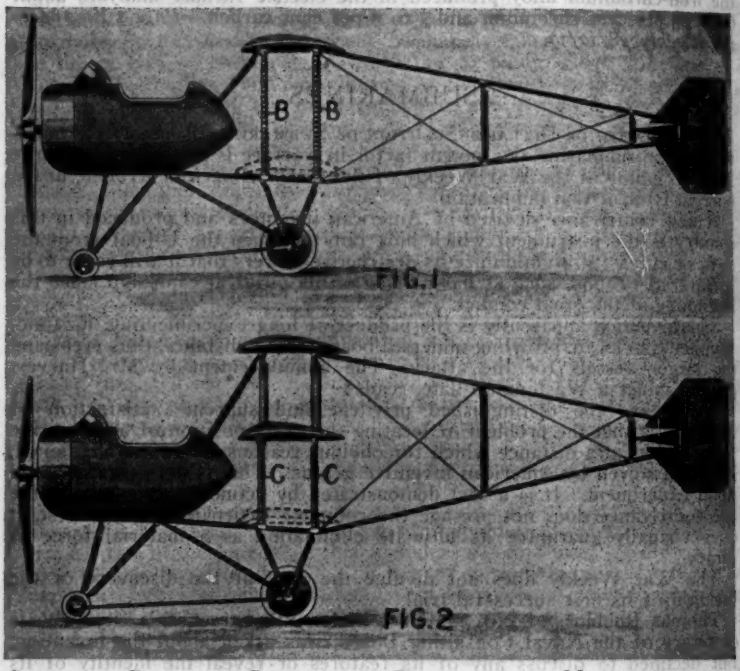
Thomas Robbins, of No. 144 East Fifty-sixth Street, this city, who is secretary of the Naval Consulting Board, was asked about the invention, but declined to discuss any of its features or reveal the identity of its inventors. He did not deny that such a contrivance had been successfully tested.

AERONAUTICS

ELIMINATING A WING TO INCREASE AIRPLANE'S SPEED.—Decrease the wing surface of an airplane and you increase its speed at the expense of lifting power. With this fact in mind, Edward Victor Hammond, of Balham, Surrey, England, has worked out the ingenious airplane arrangement depicted in the accompanying drawings. His invention, it will be noted, provides means whereby the lifting or weight-carrying capacity of airplanes, and also the speed and climbing abilities, can be varied as desired. The two drawings show, respectively, the arrangement for a biplane and a triplane. In a biplane machine the inventor causes the lower plane or planes to be raised into such a position as to close firmly against the underside of the top plane or planes, by means of revolving the interplane struts *B*, thus transforming a biplane into a monoplane. In a triplane machine the lowest plane or planes are caused to be raised into such a position as to close firmly against the underside of the center plane or

planes, thereby transforming a triplane into a biplane. In both these instances the closing of the plane is brought about by revolving the interplane struts, which struts are shown at *B* and at *C*.

The interplane struts in Mr. Hammond's plans are threaded with a screw thread for their whole length in the case of the biplane machine. In the triplane the screwed interplane struts are threaded on their lower halves, the screwed struts passing through sockets in the collapsible planes. It will be obvious that when the threaded interplane struts are revolved by any



SCHEMATIC PLANS FOR CONVERTING A BIPLANE INTO A MONOPLANE AND A TRIPLANE INTO A BIPLANE WHILE IN FLIGHT SO AS TO INCREASE SPEED.

suitable means, the collapsible plane or planes will be lowered or raised in accordance with the direction of motion of the operating gear.—*Scientific American*, 4/5.

THE POWER PLANT FOR ALTITUDE FLYING.—By E. H. Sherbondy.—One of the most important strategic phases of the war to-day has become the destruction of enemy military and naval bases, systems of transportation, bridges, etc.

We all know that the only one thing that could have prevented the Germans from carrying out or continuing the recent drive would have been the destruction of the bridges on the Rhine.

To destroy the bridges on the Rhine means bombing those bridges during the daytime. To do this means going over hundreds of miles of embattled forces, hostile aeroplanes, and anti-aircraft guns.

The only way to reach the Rhine bridges is to do what the Germans have done, to some extent, in bombing London and Paris during the past year.

They flew at such a great height that they were not detected until they came down over London and Paris and dropped their bombs.

We must now think in terms of rising to heights over 25,000 feet, so as to pass the enemy's lines and over the enemy's aerial patrols undetected.

Flying at altitudes of over 25,000 feet can only be done by producing a motor capable of giving sufficient power to climb above these altitudes. This may be carried out in two ways:

(1) By developing a fuel impregnated with the oxygen required for combustion.

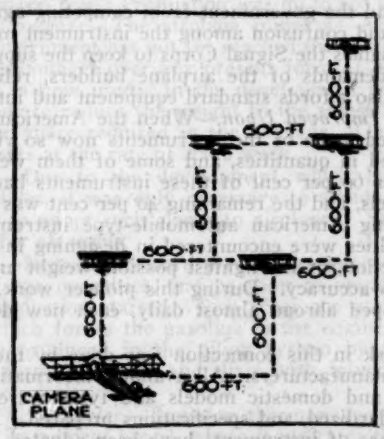
(2) By pre-compressing the air required for combustion so as to have the same number of pounds of oxygen available for combustion that are available at sea level.

The Aircraft of the Near Future Will Have Two Power Plants for Altitude Work.—The aircraft of the future will have two power plants for altitude work, one of which will be adapted and suitable for operation up to 20,000 feet altitude, and the second will be designed specifically to operate in rarified air which is encountered at altitudes above 20,000 feet.

The Resistance to Movement is Greatly Reduced at High Altitudes.—The revolutionary German long distance super-gun, which is reported as firing a projectile 60 to 70 miles, accomplishes this result by firing at a high angle, so that the trajectory is a hyperbole, whose zenith is in the neighborhood of over 15 miles above the sea level. The density of the air above 50,000 feet is sensibly constant up to 200,000 feet and the absolute pressure is in the neighborhood of 1.4 pounds per square inch.

Hence the density of this air is reduced to about one-tenth of the atmospherical pressure at the sea level. The resistance to movement in this highly rarified air is greatly reduced. As a consequence, the possible velocity of the projectile is immensely increased over that of a projectile fired on a flat trajectory.

The same would be true in aeroplanes, provided the power did not decrease as a function of the density of the air. As an actual matter of fact, the speed of aeroplanes, instead of increasing with increasing altitudes where the resistances met with are reduced, they decrease in power and speed because of a lack of oxygen available for combustion to provide the motive forces.—*Flying*, May.



HOW FIGHTING AIR PATROL LINES UP.

The V-formation, with the camera machine in front and below, the five protecting planes above and behind it.

—*Baltimore Evening Sun*, 25/4.

THE DELICATE NAVIGATING INSTRUMENTS USED BY AVIATORS AND HOW THEY ARE BEING SUPPLIED TO THE SIGNAL CORPS.—The Signal Corps authorizes the following:

Before an airplane can be put into military service it must be equipped with nine or more delicate aeronautic instruments, some of which are absolutely essential to exact flying, and all of which contribute to the successful operation of a plane. Without them a pilot would soon lose his location as to height and direction; he would not know his speed through the air, the speed of his propeller, the amount of gasoline in his tank, the temperature of his cooling water, or if his oil was circulating. He could not tell whether he was banking properly on his turns. These comprise the necessary flying instruments, but an aviator could not fly to any great height without another valuable instrument, an oxygen-supplying apparatus, nor could he operate his guns, signal headquarters, release his bombs, or "shoot" his cameras without additional mechanisms.

Two Sets Sometimes Necessary.—All these instruments must be ready for installation on the airplanes as soon as they are assembled, for no plane is complete without them. In some instances, particularly for the two seaters and the heavy bombing machines, two and even three instruments of each sort are necessary, totaling sometimes as many as 23, but for ordinary work only about 9 of them are needed. The average cost of a set of navigation instruments for a single plane is $350.

For operation of actual combat planes, such as observing, photographing, bombing, and fighting planes, many other complicated and expensive instruments and sets of apparatus are necessary. Among them are machine guns, gun mounts, synchronizers, bomb racks, bomb-dropping devices, bomb sights, radio, photographic, and oxygen apparatus, electrically-heated clothing, lights and flares. The cost of such additional accessories would bring the total cost of equipment for a plane to several thousand dollars each, depending upon the type of plane. But these devices will not be discussed in detail here.

One Purchasing Center.—The Signal Corps is purchasing practically all the purely navigating instruments and selling them at cost to the manufacturers of the airplanes as they are needed to meet the actual output of planes. This provides one purchasing center and prevents the various airplane companies and the government from competing against one another, creating disorder and confusion among the instrument manufacturers. At the same time it enables the Signal Corps to keep the supply of instruments adequate for the demands of the airplane builders, relieving them from this work, and it also affords standard equipment and interchangeability.

Foreign Models Improved Upon.—When the American air program began to be developed, none of the instruments now so vital to the service was being produced in quantities, and some of them were not being produced at all. Over 60 per cent of these instruments had to be developed from foreign models, and the remaining 40 per cent was secured by modifying or remodeling American automobile-type instruments. Numerous and serious difficulties were encountered in designing instruments, capable of quantity production, of the lightest possible weight and under exacting requirements as to accuracy. During this pioneer work, new instruments were being developed abroad almost daily, each new design carrying an improvement.

Most of the work in this connection was done by the Signal Corps in conjunction with manufacturers. All available information and data were collected, foreign and domestic models and types were carefully tested, designs were standardized, and specifications prepared. Results show that types for every class of instruments have been adopted and put into production here. Far greater standardization has been reached than exists in Europe to-day, tending to increase quantity production materially and decrease the number of replacement parts necessary.

New Sources of Supply.—Quantity production on the scale necessary demanded the enlargement of all existing sources of supply and the creation of many new plants and factories. A certain amount of time was available before it was necessary to use these instruments on planes in service—the planes themselves had to be built. Accordingly, orders were placed from three to eight months ahead of requirements, but only in such quantities as would insure a steady production, owing to the certainty of improvements in the various designs.

The early plans of the production department have developed from two to five sources for each instrument, established both as a safety measure and as a means of placing future orders on a strictly competitive basis.

Some of the Instruments.—Various instruments developed by the Signal Corps include:

The *tachometer,* or revolution counter, is an instrument which indicates the number of revolutions per minute at which the engine is running. Unlike the speedometer on an automobile, it does not translate revolutions into miles per hour; another instrument gives the speed in relation to the air. When instrument matters were taken up last July there were no tachometers manufactured in this country of the type which has proven most successful abroad; namely, the escapement or chromatic type. Two large manufacturing companies are now turning out these instruments in large quantities, one of them 100 a day, and a third company has also in production a new centrifugal type.

The Air Speed Indicator.—The *air speed indicator* is a pressure gauge for showing the speed of the plane in relation to the air, not the earth. This instrument includes what is known as a Venturi-Pitot tube, which is fastened to a strut and takes in the air from ahead. The air sets up a corresponding pressure in an auxiliary tube, which is calibrated and indicated on a dashboard recording pressure gauge.

The altimeter is an aneroid barometer, graduated to read height above the earth instead of pressure. Under standard specifications a reduction in weight and size was effected in the manufacture of these instruments, which are now being produced in large quantities and of a quality equal to the best foreign make. Three standard types are made, with ranges of 20,000, 25,000 and 30,000 feet. Production was up to 500 a week in April.

The Aeroplane Compass.—The airplane compass.—After much experimental work, this instrument has not yet reached the perfection desired. A new type, having advantages over any present form of compass, especially as to compactness, is now used. In the development of this instrument, effort has been made to reduce the weight to the safest possible minimum and to decrease the space required in the airplane. One concern is now turning out compasses at the rate of 200 a week.

Airplane clocks.—Due to the development which had been made in clocks for automobiles, it was only necessary to standardize a design of mounting in order to adopt such clocks to airplanes. Sufficient quantities are now available for all needs.

Pressure gauges.—Instrument-board pressure gauges were already manufactured here in large quantities, and as soon as standard specifications were developed, production started. Two types are used, one to register the air pressure which forces the gasoline to the engine and the other to show the pressure produced in the oiling system by the oil-circulating pump. Standard forms of cases and dials with interchangeable glasses and bezels have been designed.

The Radiator Thermometer.—Radiator thermometer.—This instrument is mounted on the instrument board, where it indicates the temperature of the cooling water in the engine. Undue heating shows that the engine is not running properly or that more water is needed. Thermometers of this type made here were, and still are, being submitted to extensive tests. Efforts were also made to stimulate the trade toward developing more

accurate and reliable instruments, and now a sufficient supply is available from two sources.

Banking indicator.—This is an instrument used to show when a plane is correctly banked in making a turn. Spirit level, balance, and gyroscopic types are being used. The problem of indicating the extent to which a plane is inclined to the horizontal in the air is a very complicated one. No simple solution has yet been reached. Fortunately, it is not often necessary to determine whether the plane is exactly horizontal, except in connection with bomb dropping. Development work is under way which it is hoped will lead to improvement of devices already in use abroad.

Aldis sight.—This sight, which is used in connection with fixed guns firing through the propeller, has been copied, as regards its optical features, from an English instrument; but the construction has been modified in such a way that the behavior of the instrument in actual use will probably be very much improved. After a number of tests and experiments satisfactory instruments are now available. The makers have been assisted in recomputing the lenses to suit the optical glass available in this country. The illumination of these sights for night operation is also being studied.

Standardization of Parts.—Standardization in connection with the design of the above instruments has been found possible, without delaying production to a much greater extent than has been done abroad. In this way the number of necessary replacement of parts has been considerably reduced, and a uniform type of dial has been adopted which, as to legibility, will be equal to the best that has so far been used. All finished instruments are carefully tested before being mounted on the planes.

Among other things, safety belts for pilots, observers and gunners have been designed and are now in production; radio and photographic apparatus, ordnance devices and oxygen apparatus have also been developed and put in course of manufacture.—*Official Bulletin*, 7/5.

UNDERGROUND HANGARS OF THE GERMAN AIRMEN.—These are unhappy days for the German flying men. Not only are they confronted by overwhelming numbers when they take to the higher altitudes, but even when resting in their shelters many miles from the battle front they are subjected to the attacks of enemy airmen.

Almost four years of continuous warfare has disclosed the fact that the German is not slow to put new ideas into execution. So it is not surprising to hear that the German airmen have resorted to the same device as their brothers in the first-line trenches, namely, underground shelters and hangars as a protection against hostile attacks. It is learned from allied intelligence officers that at many points on the western front the enemy is busily engaged in building underground hangars and quarters. And this, after all, is nothing more than carrying out their program of wonderful subterranean shelters on a far greater scale than heretofore attempted by the infantry.

It appears that the Germans are excavating roomy caves below the surface, which they roof over with a heavy layer of sandbags and the original sod. The roof is supported by pillars at frequent intervals, so arranged as to interfere the least possible with the movement of the airplanes. From the entrance of the underground hangar there extends to the surface an inclined runway of concrete, which can be used most admirably in starting a flight; indeed, no matter what may be the condition of the surrounding terrain due to rain or snow, the concrete runway is always ready for service. As likely as not the Germans are using or will use large strips of canvas painted the same color as the surrounding grass, to camouflage the concrete runway and the entrance to the hangar. While speaking of camouflage, it is also well to mention that they intend using decoy or dummy aerodromes some distance away from the underground hangars in order to draw off enemy attacks from the real objective.

It would be a case of sheer ignorance to deride this latest German idea, for in many respects it has marked advantages, particularly from the German point of view when the allied aviators are nightly attacking the German airmen at their camps. Furthermore, it is not infrequent for a severe wind storm to cause considerable damage to the usual aerodrome. Obviously, an underground hangar, if properly built and waterproofed so as to avoid excessive dampness which would certainly prove most harmful to the airplanes and other equipment, ought to be one solution of the housing problem.—*Scientific American*, 4/5.

MERCHANT MARINE

CONCRETE SHIP "FAITH" HAS TRIAL.—The 7900-ton steamer *Faith*, the largest concrete ship in the world, built by the San Francisco Shipbuilding Company, had a successful trial trip last week, averaging more than 11 knots an hour in its four trips over the official trail course. The *Faith's* engines were installed in 44 days, it being a local record. The success of the trip will result in the construction of three more concrete boats, each larger than the *Faith*, at Redwood City by the same company.—*Nautical Gazette*, 11/5.

ELECTRICITY TO RUN SHIP.—*Biggest Vessel of Its Kind in the World Has Just Been Built in England.*—London, May 6.—The biggest electrically-propelled ship in the world has just been built in England. It will be operated like a street car and will have 10 per cent more cargo space than a coal fuel ship of the same tonnage.—*The Star*, 6/5.

CONTRACTS TO BUILD 5 NON-SINKABLE SHIPS.—The Foundation Company of this city, through Franklin Remington, its president, announced yesterday that it has received from an unnamed government the contract for the construction of five steel ships of a new and supposedly non-sinkable type. The vessels are to be constructed within a year at a site near New Orleans just acquired by the company and now in the process of transformation as a shipyard.

"Naval architects in this country and abroad have worked out hundreds of designs for so-called non-sinkable ships, but few, if any, have been developed beyond the theoretical stage," said Mr. Remington. "In this case, however, an experimental boat was built and tested with results so satisfactory that the government interested has authorized the building of five vessels of this type. They will be of 42,000 tons dead weight and will have oil-burning engines."

These vessels, it is asserted, will be virtually submarine-proof. Tests of an experimental ship combining identical features have led naval architects to the belief that the new type of vessel will do all that was claimed for it, the company officials say.

The hull consists of two parallel cylinder shells joined throughout their length by a series of heavy-braced diaphragms. The ability to resist submarine attack, it is said, depends upon the improbability of the vessel being struck by torpedoes on both sides. Each cylindrical shell is not only divided into water-tight compartments by transverse bulkheads, but entirely isolated both from the adjoining shell and from the sealed space between the two. The latter space, it was explained, has a water-tight bottom and deck and is not used for cargo, but is provided solely for reserve buoyancy.

Claim is made for the new type by the Foundation Company that the proportions of the ship are such that it will not sink even though all the compartments on one side are flooded. An added advantage, the statement says, is that the vessels ride so low in the water that their visibility is reduced and they do not furnish a fair target for gun-fire.

Another new feature of the "non-sinkable" vessels is that they are equipped with separate unit engines, and in case one set is put out of use, the other set can carry the disabled craft to port.

Defence guns will be mounted above the fore and aft deck houses. These latter will be the quarters of the crew and will be connected, for safety in rough weather, by way of the reserve buoyancy space.

It is expected that the first of the five vessels will be launched early next year, and the first completed vessel will be ready for her maiden trip across the Atlantic in April, 1919.

The American patents for this type of ship are controlled by a New York firm of engineers, of which Joseph Boero is president. It was through this firm that the Foundation Company obtained a contract for the first steamers to be built. This is the third order which the Foundation Company has received from the government in question, and brings the number of ships under contract up to 83. In addition to this, the Foundation Company is building vessels for the United States and for other allied governments.—*N. Y. Times*, 28/4.

THE DIESEL ENGINE-DRIVEN CARGO VESSEL.—Calling attention to the progress which is being made in the development of the internal combustion engine of low power for fitting in auxiliary vessels, *Shipbuilding and Shipping Record* remarks that, despite the undoubted economy possessed by these vessels, British shipbuilders and shipowners have a deep-rooted preference for the cargo vessel without sails. It is necessary now to consider why it is that the internal-combustion engine of moderate power is not yet considered a suitable machine for the propelling of cargo vessels of moderate size and power. These vessels form the bulk of our merchant fleet, and it can be asserted that if a thoroughly reliable Diesel engine of about 2000 horsepower could be designed, such as would propel a vessel of 300-foot length at a speed of about 11 knots, the demand for such an engine would be very great indeed. Two main objections have been advanced against the adoption of this type of engine; first, that it is dependent upon the supply of a fuel which comes from abroad, and, secondly, that the Diesel engine has not yet reached the same state of reliability as the reciprocating steam engine of the same power. The chief objection is undoubtedly the latter. There are many services in the course of which vessels could obtain adequate supplies of fuel oil at very cheap rates, and yet vessels for these services are still built which are propelled by steam engines, although oil fuel boilers are often employed. When it is remembered that the employment of the same oil in a Diesel engine would result in an approximate halving of the fuel bill, the advantage of adopting this type of engine is apparent, always provided that an equally reliable engine can be obtained. The United States Shipping Board is constructing a number of standard oil tankers, and yet these vessels are all propelled by steam engines. It would appear, therefore, that the main problem is one of designing a reliable type of internal-combustion engine.

The war must be held responsible in a very large measure for retarding the progress of the Diesel engine, especially as far as the British-built engine is concerned. There have been a few of the well-known continental firms who have built a special type of Diesel engines, such as Burmeister and Wain, Sulzer Bros., and Schneider, and there have been British engineering firms who have taken up the construction of Diesel engines of the pattern produced by one or other of these continental firms, introducing, perhaps, improvements of their own, but we still await greater initiative on the part of British engineers to design particular types of oil engines of their own. Of the engines built in this country, little working data are available. They all, of course, showed the great economy of fuel consumption which makes the Diesel engine so efficient a form of prime mover, and thereby compels designers to continue to attack the problem of the production of engines of this type, but from the point of view

of reliability, freedom from breakdown, and cost of construction, maintenance and repairs, they all left very much to be desired. Doubtless improvements are being made which tend to increase the reliability of these engines, and but for the war a far greater amount of attention would have been given to the problem so that progress would doubtless have been more rapid than it has actually been.—*Nautical Gazette*, 2/5.

STANDARD SHIP DESIGN.—*Owners' Comments on a New Type.*—(From our Shipping Correspondent.)—It seems likely that shipowners may press for a little more information respecting the "N" type of fabricated standard ship which was recently described by the First Lord in the House of Commons. This particular type, the First Lord explained, was "designed by the Admiralty in the Department of the Director of Naval Construction in close consultation with the Department of the Controller" and, giving some details, he said: "Comparing this type with the type 'A,' which was the original design, we get 2470 tons additional deadweight capacity for an extra 11½ feet in length. Each ton of net steel in the new type will yield 4.06 deadweight tons, against 3.53 tons for each ton of net steel in the original type, an increase of carrying capacity of 15 per cent for each ton of steel. Not, I think, a bad result for these experts branded as amateurs!"

Owners quite recognize that, without adding much to the length of a ship but by increasing the beam and depth, the deadweight-carrying capacity could be raised. But they point to the existence of a danger that such a vessel would not have space for the stowage of sufficient ordinary cargo to put her down to her marks—*i. e.*, to enable her to carry her full weight. Alternatively, it is argued that if a cargo of sufficient density were found to enable the ship to carry her full deadweight, then the question of her suitability for heavy weather would arise. The theoretical gain in the carrying capacity of such a vessel would, they maintain, in practice be likely to be lost.

While owners will gladly give full credit to any ingenuity which is proved to be effective in stimulating the rapid production of tonnage, it is not unnatural that they should view somewhat critically departures from established and successful forms of design. It is they who, together with the shipbuilders of the country, were responsible for maintaining the supremacy of the British mercantile marine before the war, and they would be loth to accept any suggestion that they did not select the most suitable forms of design. Further, it is pointed out that the "A" class of standard ship, with which the "N" type is compared, was the result of "deliberations of high shipping and shipbuilding authorities."—*London Times*, 15/4.

WORLD'S SPEED RECORD MADE IN BUILDING STEEL COLLIER.—*New York Company Completes 5500-Ton Steamship in 27 Days.*—The United States Shipping Board authorizes the following:

The steel collier *Tuckahoe* was launched from the Camden ways of the New York Shipbuilding Co. at 10.30 o'clock Sunday forenoon, thereby establishing a world's record in rapid ship construction.

The record was 27 days, 2 hours, and 50 minutes. This means that within that period a 5550-ton steel steamship was built from keel to truck and launched practically complete in every detail—boilers in place, engines installed, masts stepped, funnel in place, propeller fitted, rudder hung, and only finishing touches to be put on.

Forty-one Days Ahead of Time.—The *Tuckahoe* was to have been delivered on June 15. The company, therefore, got her out 41 days ahead of time.

The vessel has a length of 330 feet, a beam of 50 feet, and will be endowed with a speed of 10½ knots.

This accomplishment of building a steel steamship of this bulk in a fraction more than 27 days is one of the marvels of the day. It surpasses

any record hitherto made in any shipyard of the world. The best record of any British shipyard is said to be about two and a half months. Previous to our entrance into the war American shipyards had not outstripped British competitors in the rapid construction of merchant tonnage.

The *Tuckahoe* was christened by Miss Helen Hurley, the young daughter of the chairman of the shipping board.

Chairman Hurley, who made a congratulatory address to the shipbuilders, read the following letter from President Wilson:

The President's Letter.—The White House, Washington, May 3, 1918. To the Workmen and Executive Staff of the New York Shipbuilding Company, Camden, N. J.: My Dear Friends: I want to congratulate you on the extraordinary record you have made in your work on the steamship *Tuckahoe*. I wish I could be present in person to express to you the feeling that I have that we are all comrades in a great enterprise and that you have played your part with extraordinary devotion and skill, eliciting not only my admiration, but I am sure the admiration of all who will learn of what you have accomplished. I congratulate you and bid you Godspeed.

Cordially and sincerely yours,

WOODROW WILSON.

—*Official Bulletin*, 6/5.

WHAT DO YOU MEAN BY "A MILLION TONS OF SHIPPING?"—Recently the Germans announced that in a certain period they had destroyed a million tons of British shipping. London countered with the reply that the actual tonnage was less than 500,000.

Yet both statements were true, and, indeed, they were identical, save that they refer to different kinds of tons.

Let us examine this matter of tonnage calculation and endeavor to present the facts so that a layman will readily understand the figures. What the average American wants to know is how many tons of supplies a vessel will deliver in Europe, and we cannot recall that we have ever seen an official statement which calculated in that simple sort of unit.

When we hear the word "ton" we are inclined to think of 2000 pounds. Alas, before we can understand this subject we must rid ourselves of the simple arithmetical rules of childhood and face the fact that there are at least four utterly different meanings to the word "ton" as used in the shipping trade, and that while in two of these cases the word refers to a matter of weight, in the other two it relates to a measurement in cubic feet and has no concern whatever with weight. Finally, you must know that even after you understand the four meanings of "ton," that doesn't greatly help you to find out how much cargo a vessel will carry.

There is an obvious reason for using one system of measurement for fighting ships and another for cargo vessels. In the latter case we want to know how much freight can be carried, while in the former there is no such thing as freight.

Therefore, naval vessels are usually measured by "displacement." When we say, for example, that the dreadnought *New York* is of 27,000 tons, we mean simply that she *weighs* 27,000 tons. And since she "displaces" water equal to her own weight, we are accustomed to say that she has a displacement of 27,000 tons.

When we come to merchant vessels, the complications begin. First we say, for example, that the shipping board hopes to turn out in 1918 vessels of 6,000,000 *deadweight* tons. What this really means is that if we should take all these vessels at one time, absolutely new and empty, and if we should put on board their crews, fuel, the consumable stores, and supplies of all sorts, and should then put cargo on board them until they were carrying the maximum amount with which they could safely go to sea, then the weight of all these various things, from crews to cargo inclusive, carried by these ships would be 6,000,000 tons. The *total* deadweight

(and liveweight) they will safely hold is 6,000,000 tons. Obviously this does not mean that these ships can take 6,000,000 tons of cargo.

The British Government gives out a weekly statement that so many tons have been destroyed by submarines. These are *gross* tons, and have no relation whatever to weight. To understand what a "gross" ton is, one must realize the reason for this sort of measurement. You are interested in knowing how many tons a ship will carry. Now, clearly, she will carry more tons of iron than she will of loosely-packed feathers. In other words, the bulk of the freight—its cubic content—has something to do with the quantity the ship will carry. So it became usual to calculate the bulk of various packages of freight, and then to measure the inside of the ship and so find out how many of such packages she would carry. It would have been simpler if we had just measured the vessel and said that she would hold a bulk of so many hundred cubic feet. But we didn't. We took the over-worked word "ton" and said: "We won't use the expression 'one hundred cubic feet,' but 'one ton,' and we will mean exactly the same thing."

Now, ridding ourselves, for the sake of simplicity, of certain arbitrary legal rules as to how you shall measure and between what points, it is correct to say that when we speak of *gross* tons we are referring to the inside measurements of the cubic volume of the ship. For example, the ordinary office room or living room contains about 3000 cubic feet of air. It has, therefore, in the language of the merchant service, a measurement of 30 gross tons. If we take the ship, new, and with her deck houses and enclosed spaces complete, and if we measure her on the inside and find that she holds 1,000,000 cubic feet of air, then we say she is of 10,000 times 100 cubic feet internal volume, or that she is of 10,000 *gross* tons.

This is also equivalent to saying that if we have a cargo of wool or hemp in bales, or starch in cases, of which 100 cubic feet will weigh a ton, then we could stow in that ship 10,000 tons of this cargo, provided we made no provision for engine or boilers or living spaces. That is, her *gross* capacity for such freight would be 10,000 tons, or she is of 10,000 tons *gross*.

But this is so theoretical that it brings up the necessity for still another sort of ton. Clearly we must allow space for the engines, crew, etc. Let us suppose that we find that these necessary spaces take up one-third of the ship and that two-thirds of the room are left for cargo. Then into this *net* space, this two-thirds, we can put two-thirds of 10,000 tons, or 6666 tons, of our hypothetical cargo. So we say the vessel is of 6666 *net* tons.

But there is another complication, for freight charges for such a cargo are based on tons of only 40 cubic feet!

Now, perhaps, we are better able to discuss the practical question, "How many tons of average, mixed, miscellaneous supplies will a given ship carry over and deliver to Europe in a year?"

This depends on how many trips she will make, consequently on her speed and on the wharfage facilities which give her quick or slow discharge. It depends on whether she is somewhat like the *Vaterland*—now the *Leviathan*—built for passenger and not for freight traffic. It depends on how much cargo space she must give up in order to carry enough coal for the voyage; if she is to make the trip at 20 knots she will require about eight times as much coal as if she is to do it at 10 knots. Allowing, however, in a fair, practical way for all these factors, and remembering that nowadays the vessel must take enough coal for the entire round trip and that she must zigzag and run fast in the danger zone, we believe that if from the average vessels now at the disposal of the government we take enough ships to represent one million *deadweight* tons, these same vessels will measure 667,000 *gross* tons, or 500,000 *net* tons.

Such vessels would carry on a single voyage about 450,000 tons of government supplies. In view of present terminal conditions, they would

make about five trips per year and deliver a total of 2,250,000 tons of freight.

Let us apply these figures to a single ship of, say, 7500 tons deadweight, which is about the average size of the steel ships now building under the shipping board. Then as to such a vessel the probable statistics are these: She is of 7500 *deadweight* tons; take two-thirds of this and we may say she is of 5000 tons *gross;* again take two-thirds and she is of about 3750 tons net register; she will carry about 3500 tons of general cargo per voyage, will make about five round trips per year, and so deliver to our army about 17,500 tons of supplies per annum.—*Sea Power,* May.

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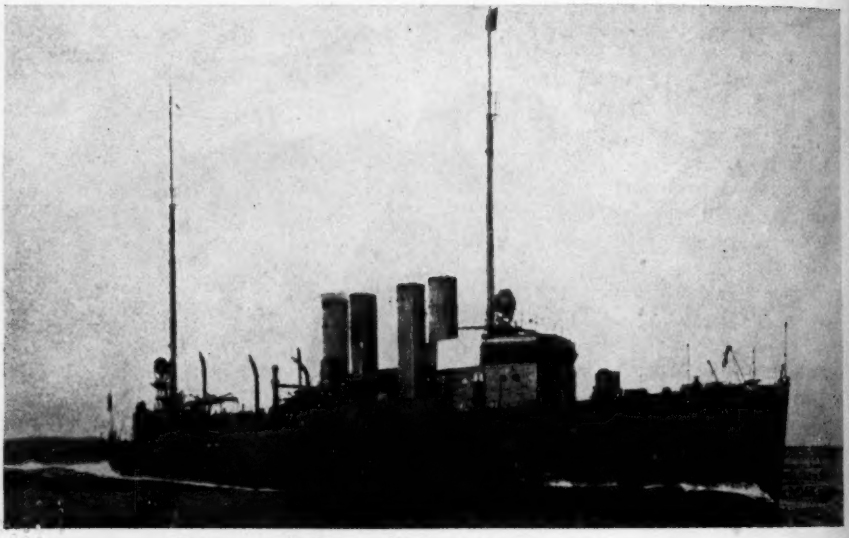

DESTROYER "MANLEY" BADLY INJURED IN COLLISION.

The destroyer *Manley,* one of the recent types of the U. S. Navy, was badly damaged and her commanding officer and a number of enlisted men were killed, when she collided with a British warship abroad. A depth bomb exploding did the greatest part of the damage. (Photo by International Film Service.)

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NAVAL WAR NOTES

PREPARED BY

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STRATEGY

Can Our Heavy Ships Go to Europe?—The sending of more American warships to the other side, particularly if they have to be capital ships and if their station is to be the Mediterranean, brings us face to face with a serious problem.

Fighting ships, operating in distant waters, require the support of auxiliary vessels, a train of supply ships, ammunition carriers and colliers. The necessity for these auxiliaries and the situation of the United States Navy with regard to them was stated by Admiral William S. Benson, Chief of Naval Operations, to the Committee on Merchant Marine on March 9, 1916, as follows:

"In time of war, or preparation for war, it would be necessary for us to very largely increase the number of our auxiliaries in order to carry fuel, supplies, and, under certain conditions, a certain number of men. . . . . Should it be necessary for us to conduct a campaign across either one of the oceans . . . . it would be necessary to have a considerable number of fuel ships, not only to accompany the fleet, but many to be going back and forth from the source of supply.

Half a Million Tons Short.—"At present we have 24 fuel ships, and we are asking for a few more. . . . . We have 12 of the larger ones carrying from 7500 to 12,500 tons, and then we have a number (six or eight) of the smaller type of colliers that were bought at the outbreak of the Spanish-American War, but which are very small and rapidly reaching the stage where it does not pay to repair them. It is hardly economical to run them, because they carry so little coal. And then, of course, we hope in case of war to be able to draw on the Panama Canal colliers and fuel

ships. But even with all of those we find that at present we are short a certain amount, some four or five hundred thousand tons, of what we would need in time of war or proper preparation for it."

Our Navy's Needs.—In a letter to the Secretary of the Treasury dated July 27, 1915, Admiral Benson gave the requirements of the navy as to colliers as follows:

"Fleet colliers.—Number required, 4. Characteristics: Speed, at least 12 knots; steaming radius, 6000 to 8000 miles; gross tonnage, not less than 5000 tons (equivalent to about 7500 dead-weight tons).

"Service colliers.—Number required, at least 200. Characteristics: Speed, at least 8 knots; gross tonnage, not less than 3000 tons (equivalent to about 4500 dead-weight tons)."

The fleet colliers accompany the fleet and are built to coal battleships at sea. The service colliers would carry coal from the United States to the American naval base in Europe. Without this service an American battleship fleet in European waters would have to depend upon British coal—and the present shortage of coal in England and all the entente countries of Europe is a serious war problem.

Such was the situation in July, 1915. In March, 1916, Admiral Benson stated that "the conditions are just the same, practically."

The navy sought an appropriation for the construction of the four fleet colliers, Admiral Benson says, in 1916, but the naval appropriation bill of that year, making appropriations for the fiscal year ended June 30, 1917, did not carry such an item. The colliers were not provided for until Congress began the enactment of war emergency legislation. In his testimony before the House committee, Admiral Benson said, in response to inquiries as to the length of time it would take to build such vessels:

"Approximately six months would be required to prepare plans and place the orders for the material required for vessels of a new design. It would, therefore, require about two years to produce the first ships, and six such vessels could be constructed simultaneously during that time. . . . . After two years ships could continue to be produced at the rate of about seven a year, provided they were reproductions of those already built."

We Face a Serious Situation.—Undoubtedly, the situation with regard to colliers and auxiliaries in our navy is more serious than any other phase of our naval problem. The above review of the Russian situation shows clearly enough the likelihood that exists of an urgent necessity developing for the sending of more American warships to the other side. Altogether apart from that situation, however, there are many naval experts who believe that the whole American naval strength should be concentrated in the war zone. In any event the need for colliers and auxiliaries is obvious.

Naval preparedness, no matter how excellent it may seem on the surface, can be rendered useless by weakness in one element, and it is idle to attempt, in this war, to make things look better than they are. There is no desire to be unduly pessimistic, but it is high time that attention was given this situation and especially that steps be taken to supply and maintain the whole American naval force "over there."—*Sea Power*, May.

THE CHANNEL STRAITS.—By A. H. Pollen.—The following question has been put to me: "I observe that, in the current number of *Land and Water*, your colleague, Mr. Belloc, in explaining the enemy's selection of the Messines-Givenchy sector for his recent attack, points out that, among the arguments in its favor, 'for what it is worth there was the moral effect of an attack developing close to, and threatening that highly sensitive point, the straits of the Channel.' Is it not possible that he had something more than 'moral effect' in view?

"I am driven to ask this question: Is it possible the enemy has some objective, altogether independent of the direct military advantages of his procedure? Is he, in other words, trying to maneuver us into giving up Dunkirk, and then, possibly, Calais? If there were some overwhelming

naval advantage to be gained by the possession of Dunkirk, his policy might seem to be justified. Is it possible to state, with some precision, the change that would be brought about in the naval position if the enemy were either at Dunkirk, or at Dunkirk and at Calais?"

In essaying to answer this question, I shall not attempt to assess either the probability of or the military effect of our withdrawal from Dunkirk, or of our being compelled to give Calais to the enemy. Though the first seems to me highly improbable, and the second altogether out of the question, all I am concerned with here is to deal with the effect their tenure by the enemy would have in assisting his naval operations in impeding ours, and in giving him means, other than naval, for interfering with our sea traffic. Before attempting a reasoned answer, it might be as well to glance at what may be called our traditional policy with regard to the Dutch, Flemish and French Channel ports; for it is really to this tradition, and not to the facts of the situation of to-day, that we must look for the moral effect of which my colleague wrote last week. From very early times it has been taken for granted that the possession of these ports by an enemy must constitute a serious sea menace. It is largely for this reason that, ever since the fall of Napoleon, the maintenance of the independence and neutrality both of Holland and of Belgium has been a corner stone of our foreign policy. When, therefore, in September and October, 1914, the enemy, having seized Ostend and Zeebrugge, was engaged in a determined effort to get Dunkirk and Calais as well, the utmost uneasiness was created in this country. But I do not think many people could have stated explicitly their exact ground for uneasiness in the sense of being able to say precisely what particular naval and military operations the possession of these ports would have made possible for the enemy. People forgot that our historic attitude in this matter dated from the period when there were not only no submarines, but no 30-knot destroyers, nor guns with the modern command of range, nor air power. Consequently, if it was traditional policy with us that the Dutch ports, the Flemish ports and the French ports should be in separate possession, and two of the groups neutral, it seemed necessarily to follow that, if an enemy could get two groups into his own possession, not must an immediate blow have been struck at our prestige, but some kind of naval loss of a serious kind would follow. Calais and Dunkirk, then, grew into symbols just as Verdun did later on. To possess them became an end in itself, and hence their denial to the enemy became of crucial importance.

As a simple matter of fact, the actual possession of Dunkirk, or even of Calais—viewing the thing altogether apart from the military consequences involved—would affect the naval position adversely at a single point only. And the explanation of this is not very recondite. The two governing factors at sea are, first, that the enemy's only free naval force is his submarine fleet, which is almost independent of port facilities, and, secondly, that outside the immediate vicinity of his larger ports, the enemy possesses no freedom of surface movement at sea at all. If you examine these propositions separately, their truth becomes obvious. The two main and most profitable fields of the enemy's submarines have been from the Chops of the Channel westward, and in the Mediterranean *passim*. To be a thousand miles from its base makes, therefore, very little difference to the submarine. To give a submarine-using enemy a base a few miles nearer his main field would consequently confer no advantage on him of any kind whatever.

Curiously enough, if we suppose the Channel to be the field of their operations, the same thing is true about the enemy's surface craft, though for a very different reason. For, as things stand to-day—and as they would stand if he got Dunkirk, Calais, and even Boulogne—his freedom to get his destroyers or other ships out of harbor can be exactly measured by the distance he is from the nearest British base. The truth of this was instructively shown last week. Twice in the course of a few days

we heard that our ships had swept into the Kattegat and the North Sea, each time destroying German trawlers on outpost duty, and capturing their crews. On two other occasions unsuccessful efforts were made to cut off destroyers that had been bombarding parts of the Belgian coast, west of Nieuport. On each of these the enemy escaped in the darkness. The point of the contrast lies in this. When he is four or five hundred miles away from a British base, the enemy can venture out by daylight, so long as he does not go so far afield that he may be cut off and brought to action before dark. If no British force appears in such distant waters for some days together, he may even venture to send out light craft, such as trawlers, either to lay mines or to sweep for them, or to engage on some other operation. But even here he risks their destruction if he does so. But from Zeebrugge, which is less than 80 miles from Dover, he dare not venture out at all except by night. You never hear of German trawlers being raided off Ostend by Admiral Keyes' command. And, whenever there is news of an engagement, it is either a midnight or a mid-fog affair.

Zeebrugge and Ostend.—Zeebrugge and Ostend, then, are, on the experience of the last three years, perfectly useless to him for any daylight work. They are just jumping-off places for night raids, and refuges into which the marauders must rush for safety at the first threat of attack. Observe that never yet has the enemy in such encounters even pretended to fight the engagement to a finish. He runs—as he did the other day—though he had a force of eighteen boats against a bare half-dozen. He cannot, from the nature of the situation, even risk delay. He must always fear a still stronger force coming on the scene. Hence, they are not bases from which systematic naval operations could be carried out, nor any orderly form of sea-pressure be put upon us by regular and methodical operations. The fact, then, that we control the surface of the sea robs Dunkirk, Calais and Boulogne of any surface-craft value to the enemy, just because they are so much nearer to our main base at Dover than are Zeebrugge and Ostend. Indeed, we can go further. If he hardly now dares come out of Zeebrugge, it is doubtful if he would run and go into Dunkirk or Calais. Neither can help him then with his destroyers. And, because submarines do not require bases into which to run for refuge, these ports are unnecessary to him for his submarine campaign.

I said just now that there was one respect in which the possession of this strip of French coast would be an advantage to the enemy. It is that the blocking of the Channel at its narrowest parts by mine barrages would be either impossible or exceedingly difficult. But the possession of Dunkirk only would hardly affect this, for from Dunkirk to Cape Gris Nez is nearly 40 miles; and our establishment and maintenance of a barrage would not be affected unless the enemy occupied not only Dunkirk, but the whole coast right round to Boulogne.

We may then, it seems to me, make our minds comparatively easy as to the effect on the naval situation of any further advances of the enemy along the French seaboard, so far, at least, as the naval situation can be affected by purely naval means. But are there not other than purely naval means that would affect, if not our naval forces, at any rate the sea traffic which it is one of the main objects of naval force to protect and guarantee? The enemy, we are told, has been bombarding Paris with unpleasant regularity from a range of 75 miles. From Dunkirk to the Downs is not more than half this distance. Every mile he can push on of the 25 that intervene between Dunkirk and Calais will very nearly reduce the range of the English coast by an equal amount. Would it still be safe for ships to come up Channel and enter the mouth of the Thames? Or would London cease to exist as a port, except for such traffic as could come to it north about? Far be it from me to suggest the limits of the enemy's ingenuity in designing, or of his industry in producing, cannon of fabulous reach. But the merest tyro in the art of gunnery would be able to reassure us on the value of this artillery as a menace to trading

shipping going up and down the Channel. If the enemy held the coast of France from Dunkirk to Cape Gris Nez, his guns could reach Shoreham on the Sussex coast and Orfordness in Suffolk; so that the whole of Kent, all of Surrey and Sussex that lie east of the main Brighton line would be under his fire. His limit of range would be just short of Croydon, from a point just opposite Erith to the south of a line through Chelmsford and Colchester. The lower corner of Suffolk, including Ipswich, would complete the danger area. The Thames, of course, would be under fire almost right up to the docks in London.

This may all sound very terrifying, but it would be entirely without naval significance, for the simple reason that at these extreme ranges no aiming with a gun is possible at all; and the value of guns of this kind, trained even on a great city like London or Paris, is not distinguishable from that of regularly conducted air raids. Indeed, as far as destruction of life is concerned, it is probable that the same number of air bombs—from the fact that their explosive charge is so much greater—would be far more deadly than the 9-inch shell, which the German long-range gun is supposed to carry. As to such guns, or even the much more accurate naval gun, being mounted on the coast to prevent the passage of merchant shipping, this menace is entirely chimerical. If the best naval ordnance in the world were perfectly mounted and controlled from Dover or Calais, shipping could, in broad daylight on a clear day, pass up mid-Channel with complete safety, if they adopted the simple precaution with which every merchant skipper is familiar, from his experience with submarines. He has only got to zigzag his course to make hitting impossible at 10 miles, and at 20 no accurate fire of any sort would be conceivable. We must, therefore, look for a purely military explanation of the enemy's present military policy.

The Submarine.—Most people, when they think about the submarine, imagine its unique merit to be its power of unseen attack. This, however, is not really the case. For nine out of ten submarine attacks have to be made with the submarine either altogether or at least partially visible. The unique character of the submarine is its power of invisible passage. It can, that is to say, set before itself a destination, and by coming to the surface only during darkness, travel in almost continuous invisibility until it has reached the desired point.

The development of under-water hearing makes it possible in some conditions to discover that a submarine is in the neighborhood. But under-water hearing cuts both ways, and for the moment it is doubtful if, in the open sea at least, the submarine has not gained most by its development. For, being able to lie motionless—and therefore soundless—on the bottom, it can, by periodically stopping to listen, decide whether at any moment it is safe to come to the surface or not. For practical purposes, therefore, the submarine, if it can avoid mines, can navigate the seas with comparative freedom from risk. Hence, though I have no definite information to guide me, I will hazard the guess that 95 per cent of the submarines that are destroyed are caught either when they are on or near the surface for purposes of attack, or just after diving from the surface, when the area within which depth charges will reach them can be judged with sufficient accuracy to make the counter-attack almost sure. It follows, then, that only such submarines are destroyed as are either surprised when their commanders think they are in safety, or intercepted when their commanders think they are taking a legitimate risk in coming up. Thus anti-submarine offensive depends for its efficacy almost entirely upon the greed of the submarine for its prey, just as the—very uncertain—success of the angler depends, as Sir William Simpson says, on the appetite "of a scaly but fastidious animal."

When men fish for a living, they do not rely on anything so uncertain as the combination of skill and judgement of the angler with the appetite or voracity in the fish. They deal with the quarry not as a creature that can

be tempted to the surface, but as a resolute denizen of the depths, and proceed to intercept him between his starting-point and his designation by means from which, being invisible and submerged, he cannot escape. The professional fishermen, in other words, recognize that the under-water quarry, if it is to be attacked wholesale, must be attacked by under-water means. The application of this counsel to the case of the submarine has, from the first, been obvious enough. The arming of merchantmen and their convoy by gun- and depth-charge-carrying destroyers, the regular patrolling of infested areas to search for submarines while recharging their batteries on the surface at night, the employment of aeroplanes to discover them near the surface—all these things may be likened to the angling side of the fisherman's craft. It is no doubt the more attractive form of fishing. It appeals more to the artist and to the sportsman. But it is too accidental to be the method that gets satisfactory results in fish brought to market. For this, wider and, if you like, brutal ways are better. For obvious reasons, you cannot trawl for submarines, nor does it seem likely that stationary obstacles, whether nets or otherwise, would be effective—if merely designed to impose a passive barrier between the submarine and his destination. Through any such obstacles as these some means could certainly be found of using a torpedo to clear a passage. But it is not at all certain that the submarine could ever find a way of evading continuous mine-fields, spread from shore to shore over the Channel and North Sea, and repeated at different depths, so that at no level or even on the surface could a safe passage be found. It looks, then, as if the only wholesale method of dealing with the submarine is to make its passage through any tract of sea that it is bound to pass, if a destination is to be reached, wholly impossible.—*Land and Water*, 11/4.

TIME LOST ON CONVOY.—*Grouping of Vessels by Speed Suggested.*—It is well known that the introduction of the convoy system has proved a success in the safeguarding of merchant vessels, and it is equally well known that there is a serious loss of carrying capacity owing to the greater length of voyages at present, as compared with the time occupied before the war. Part of this loss is clearly inevitable in view of the precautions which are taken; but Liverpool owners are of the opinion that some of the loss is avoidable.

Liverpool owners are interesting themselves especially in the matter, because it is they chiefly who are concerned with the North Atlantic trade, and in a comparatively short-distance trade, such as this, the loss soon becomes apparent. Now one great drawback to the convoy system is that the speed of the fastest ship in a convoy has to be reduced to the speed of the slowest ship. Obviously, therefore, in order to obtain the advantage of the speed of the fastest ships the most economical system would be to group the vessels of about the same speed together.

It is claimed that by putting this system into practice the dead-weight carrying capacity of the existing ships in the North Atlantic trade could be increased by between 450,000 and 500,000 tons per annum. In arranging the grouping of the faster vessels, the British and United States Admiralties could rely on the thorough support and assistance of the great liner companies. Similar help would no doubt be forthcoming from the cargo companies. The criticism is made that there is at present not sufficiently close working respecting the formation of convoys between the Admiralty and the Ministry of Shipping. As an instance, the cases are cited of two vessels which were recently kept waiting 11 days in the Mersey for escorts, and of two which were kept waiting there for seven days.

The present need of cargo space is so urgent and the carrying capacity of the liners in the North Atlantic trade is so great, that it is particularly important that no time shall be unnecessarily wased. Certain delays are, as already pointed out, inevitable, but owners believe that the loss due to the grouping of vessels of varying speeds is unnecessary. The first

step in the direction of avoiding this loss would seem to be for the Admiralty to consult with the managers of the liner companies. The owners realize that the last word on the subject of the management of convoys must be spoken by the naval authorities, but they believe that they can be of very great assistance, and they are anxious to do everything within their power to bring about a saving of carrying capacity.—*London Times*, 3/4.

LAST WORD WITH SEA POWER.—*A Vienna Comment.*—The Vienna *Arbeiter Zeitung* publishes the noteworthy admission that, whatever victories Germany may win ashore, the last trick is always in the hands of the masters of the seas. It says:

"Let no one deceive himself. Germany's victories may make the Entente more inclined to a peace by agreement, but by no victory can they be compelled to submit to a peace by compulsion. For even if the German sword should be able to achieve much more than it has yet done—if the Germans should storm Calais and march into Paris, and if the continuation of land warfare should become senseless and impossible, the English would still remain protected on their island and America by the Atlantic: they could still continue warfare by sea, and still cut off our supplies of raw materials and foodstuffs. The greatest victory on land cannot force upon England and America a peace by compulsion.

"Thus a peace is only possible if the German people refuses to allow itself to be intoxicated with victory."—*London Times*, 1/4.

A NEW GERMAN PORT.—By Arthur Pollen.—When Kerensky fell and the fortunes of Russia were confided to a government of fanatics and traitors, it became obvious that the military situation on the western front would suffer a change very damaging to us, as soon as the enemy troops, hitherto contained by our late ally in the East, could be transferred to the sole remaining field of war. What in the late autumn it was obvious must happen, has in the last three weeks actually happened. To what extent, if at all, is the naval position adversely changed by the elimination of Russia from the war?

Some weeks ago it was pointed out here that the most obvious of the naval advantages that Germany could gain by her advance on Petrograd would be the possession of so much of the Russian Baltic Fleet as was either in fighting condition or could be completed or refitted. If the battleships and battle-cruisers of the old program had been ready by their due dates, were in fighting trim, and were so surrendered, the enemy's reinforcements might be so formidable as to make it necessary for the Grand Fleet to be enlarged by all of the American 14 dreadnoughts. Nothing appeared in our press on this subject since that article was written until last week, when Reuter's correspondents at Stockholm and Petrograd informed us that the Germans had landed 40,000 men, 3000 guns, 2000 machine-guns and armored cars at Hango, and had already advanced to Ekenaes, 20 miles along the railway which, 70 miles further on, forms a junction with the line that leads down to Helsingfors. We learned also that at Helsingfors are moored two Russian battleships, a division of destroyers, five submarines, and numerous transports, and that these are icebound and cannot move, because the only ice-breaker had left Helsingfors and surrendered to the Germans at Revel, just before the landing at Hango took place. At Hango itself there were four submarines and several other Russian warships, and the commanders of these vessels, being unable to resist the landing, blew them up rather than that they should fall into the hands of the enemy.

The only satisfactory feature of this news is that some Russian warships are still under the command of men loyal enough to their country to prefer seeing their ships destroyed to seeing them tamely handed over to the enemy, not only of Russia, but of mankind. Whether the battleships

at Helsingfors are in such loyal hands we do not know. It would clearly be possible, by exploding small charges in the engine-rooms, the gun-mountings, in the guns themselves and in the ships' bottoms, to put the vessels beyond the possibility of repair, and to do so without risk of any kind to the surrounding population, supposing the ships to be moored where their complete destruction, by blowing up the magazines, would be a public danger. If they are not in such hands, the first accession of naval strength to the enemy will become an accomplished fact, and allied plans will have to be altered to meet them.

But, as has been foreseen from the first moment when the German expedition into Finland was announced, the enemy has a second naval objective in view which, if it succeeds, may prove far more embarrassing to us than any increase of his battleship, cruiser or destroyer strength. On Wednesday last week *The Times'* correspondent at Petrograd announced that Germany's Finnish allies were already advancing on Kem, a port on the North Sea, the most important town on the Murman Railway that connects Kola with Petrograd. This correspondent also hints that some allied effort is being made to prevent this railway falling into traitorous hands. If the possession of Kem were followed up by the effective occupation of Finland, not only would Petrograd be hemmed in from the North, but German access to an ice-free Arctic port would seemingly be secured, except for such opposition as a navy working with or without military assistance could oppose. The possession of this port would be of incalculable value to the enemy for various reasons.

The latest maps seem to give the name of Romanov na Murmanye to this latest Russian effort to get access to the sea, and it is situated halfway up an inlet known as Kola Bay, which is, in fact, the estuary of the River Tulom. It is situated about 75 miles from the Finnish and Norwegian boundary in the Varanger Fjord. Though nearly 10 degrees north of Archangel, it is not ice-bound in winter. It is not the lowness of temperature that makes Archangel useless in the winter months, but the fact that the southerly currents from the Arctic Ocean, combined with the prevailing winds, carry the ice floes southward into Dwina Bay, and there pack them in such masses that it is neither possible to prevent the channel being altogether blocked, nor to blast nor break a channel when the block has taken place. Kola Bay is free from both these phenomena, and though the surface may freeze, it seldom, if ever, attains the thickness that cannot easily be dealt with.

The advantages that a properly equipped port at this point would give to Russia had long been realized, and ever since the beginning of hostilities great and sustained efforts have been made, not only to complete the port itself in every respect for the reception and unloading of ships, but to complete the Murman Railway to connect the port with Petrograd. There is reason to believe that both port and railway are now ready for use.

Kola Bay.—If the Germans could seize the sea-board railhead, and establish railway communications either with Helsingfors or Petrograd—which they can occupy when they will—they could establish there a new submarine base free from the very patent disadvantages of those from which her under-water craft have now to operate. If we suppose, as seems likely, that the English channel will before long be made impassable for the submarine, and further suppose that the enemy's main field of operations must always be the western end of the Atlantic lanes, Kola Bay will only be some 600 miles further from the submarine destination: a very inconsiderable handicap when it is remembered that, in exchange for 600 miles of well-patrolled and, therefore, highly dangerous passage, the U-boats will have but double this distance to go—and a journey in which almost complete immunity from attack may be expected.

All these considerations have long been before the allied governments, and it cannot be doubted that some and, let us hope, adequate measures have been taken to prevent, not only the Murman Railway with its port,

but, if possible, Archangel, too, from falling into enemy hands. Should certain measures, however, not prove adequate, new duties will be thrown on our naval forces, and it is perhaps worth considering what they must involve.

The advantage of a Kola Bay port to the Germans would be the possession of a port free from what might be called the geographical shortcomings of her present naval bases. It is, of course, not a base that would be of value for anything except for submarine work, for it is inconceivable that any useful number of surface ships—even of the fastest destroyers—could pass through our guard and reach so distant a point in safety. And from this it follows that it is *in theory* a port, the use of which by submarines could be denied to the enemy by close investment. As has so often been pointed out, the present German bases cannot be blocked by a mine-barrage because mine-fields must be protected by surface ships, because the integrity of the German Fleet would make the defence of a mine-field near to the German harbors possible only by employing our own battleships there, and because to employ our battleships in narrow, shallow, and uncharted waters, would expose us to such disadvantages as to make the risk almost impossible. But if no powerful surface ships could be brought into Kola Bay, then a close investment of this inlet by a mine-field, watched by surface vessels more powerful than anything the enemy could have there, should, as I have said, be possible. But I use the phrase "in theory" because the actual operation would present extraordinary difficulties. For we should be, presumably, without a base on the Murman coast ourselves, and to maintain an inshore watch in the Arctic regions, 1200 miles or more from the nearest port in which it would be possible to refit ships and refresh crews, would be an undertaking entirely without precedent in warfare. Emphatically, therefore, the problems that must arise from the German possession of a port in Kola Bay are far better dealt with by prevention than by cure.—*Land and Water*, 11/4.

AMERICA'S FIRST MILLION TONS OF SHIPS NOW AT SEA.—The first million tons of ships completed and delivered to the United States Government under the direction of the Shipping Board have been put on the high seas to help defeat Germany.

A total of 159 vessels of 1,108,621 tons was completed up to May 11, according to statistics compiled by experts of the Shipping Board. Since January 1 more than half of the total tonnage, 667,896, has been delivered, and the monthly totals have shown a steady increase.

Most of the ships delivered were requisitioned on the ways or in contract form when the United States entered the war. Virtually all are of steel construction. None of the ships of the great wood program has been delivered, although 46 have been launched, due to delay in obtaining boilers and other machinery. The first completed wood ship built on contract for the government now is undergoing speed trials off the Pacific coast. Deliveries of ships last week were made at Seattle, Sparrows Point, Md.; Chicago, Ecorse, Mich.; Gloucester, N. J.; Wilmington, Del., and New York.

It was said to-night at the Shipping Board that boilers for about half the wooden hulls have been delivered and are awaiting installation.—*N. Y. Herald*, 15/5.

NEW U-BOAT RAIDERS TO COMBAT DESTROYERS.—*Frenchman Reports Latest Under-Sea Plans of Germany as Formidable.*—Realizing that the United States and allies have gained the mastery over the present type of submarine, Germany now is said to be planning a new series of big U-boat cruisers with which she hopes to again assume the offensive in her unrestricted under-water warfare.

Announcement of the new German scheme was made by Georges Leygues, the French Minister of Marine, in a recent interview, copies of which

have been received here from France. No details regarding the new U-boats were given by M. Leygues. From information from other sources, it appears that the cruiser submarines will be heavily armed and armored, and will be designed especially to meet the menace of the torpedo-boat destroyers which have proved so effective in hunting down the smaller submarines now in operation.

M. Leygues declared that the Allies are ready to meet Germany's new efforts and that they will not rest upon the "fine results obtained" in the past.

"We shall not stop," he said, "until we have cleaned up the sea as one cleans up a trench."—*Evening Star*, 14/5.

NAVAL AFFAIRS IN THE NORTH AND ELSEWHERE.—Recent British naval successes in the Cattegat, minor though they were in extent, differ greatly in character from the raids occasionally ventured upon by the Germans against the small auxiliary vessels guarding the Straits of Dover. The former were sustained efforts at a distance of 500 miles from home bases, and the latter are merely "tip and run" dashes to points well within an hour's easy steaming from either Ostend or Zeebrugge. Quite apart from material gains the Cattegat affair demonstrated that the command of the sea in the north, and, for that matter, the world around, is held in the clenched fists of the Allies; so far, indeed, from the British High Sea Fleet being "in hiding," it is eager and ready at a drop of the hat to engage the High Sea Fleet sulking behind its mine-fields and unwilling even to support the trawlers virtually destroyed in its own protected waters.

Now that the uncompensated hazards of attacking Wilhelmshaven or the mouth of the Elbe are recognized, some attention has been directed to the possibility of laying sea barriers across the lanes through which German submarines gain access to the ocean. But apart from the discontent this has excited as fresh evidence of a policy of attack, but not of defence, the possibility of associating nets and mines over the wide areas to be covered is not generally advocated, particularly as similar experiments have been discouraging.

Whether justified or not, it has to be accepted that considerable disquiet exists at the alleged lack of "initiative" on the part of the allied fleets, and that insistence is laid on the fact that a systematic defensive policy has always proved to be the most costly and disappointing form of warfare. This is finding especial expression since the collapse of Russia and the possibility that the Germans may take over its disintegrated fleet, or, in any event, find in the undisputed Baltic a safe region for that training of their ships and personnel so long denied. Little alarm is felt over any probable issue from the Dardanelles of the Black Sea Fleet, led by the *Goeben*. The combined French and Italian squadrons muster at least 17 dreadnoughts, and these, with their auxiliaries, should be able to take care of the heterogeneous vessels fresh from the Black Sea and of any reinforcements the Austrians may be able to send out from Pola.—*N. Y. Herald*, 19/4.

GERMANY DREADS SEA FIGHT, LOGIC OF BRITISH SHOWS.—The British naval success against German mine-sweepers in the Cattegat recently, says the *Daily Telegraph*, is sufficient answer to the Germans, who say that the British Grand Fleet is hiding.

Contrasting the British fleet in the Cattegat with the German raids in the Straits of Dover, the *Daily Telegraph* states that while the Germans in their bases on the Belgian coast are only 20 miles from the Straits, the exploit in the Cattegat was a carefully planned operation conducted more than 500 miles from the nearest point on the British coast.

"Such a sweep," the newspaper adds, "can be made only by a power in real control of the sea confronted by an enemy who will not risk protecting his small craft and suspecting that such intervention might be the

prelude to a general action, which he desires to avoid. The Germans had large naval forces near the scene on this particular Monday. They did not send them out, but, on the contrary, permitted 10 trawlers to be destroyed virtually under their own eyes."

The newspaper then discusses the theory that the Germans might be inviting naval action near their mine-fields and coast defences, and says that all such suggestions have no foundation among those who have knowledge of naval conditions.

The enemy, it says, has gained little new strength for use in the North Sea by the Baltic situation, while British superiority has been increased since the battle of Jutland by the co-operation of the American forces, and the entire naval strength of the United States would be available if necessary. Moreover, if the German naval forces were to be employed advantageously as the right wing of the German Army, they should have been thrown in before and not during or after the opening of the battle in France.

"If a naval battle," it continues, "could by any possibility have been decided in Germany's favor, she would have been saved the necessity of pressing forward her army and would have spared hundreds and thousands of casualties, which, on her own confession, she could not afford.

"A battle on the sea is fought simply to gain the right to use the seas for military or economic purposes. The Germans have wanted to attain that end for three years and eight months, and if they have not done so while the odds against them were less heavy than they are to-day, the reason is on the surface.

"Still we can dismiss from our minds all unsupported rumors. The watch by sea was never maintained more efficiently or more effectively than the Grand Fleet is maintaining it at this moment."—*N. Y. Herald*, 19/4.

THE DESTROYER IN THE WAR.—By M. B. Dill.—Naval authorities have frequently remarked during the course of the war, that as far as the navies of the nations are concerned, modern warfare has been much different than was ever expected.

This fact is due almost entirely to the submarine menace which has changed the plans and problems of the navies of the world in a most unexpected fashion. One of the surprising developments which has come about has been the sudden prominence of the destroyer in naval engagements and for general utility service. This new importance of the destroyer is one of the changes in naval warfare brought about largely by the activities of the German submarine against neutral and enemy commerce.

A few months before the war many of the allied naval authorities were inclined to look upon the destroyer as a type destined possibly to an early disappearance. The destroyer it was believed would be superseded by the swift submarine, just as it had taken the place of the torpedo-gunboat of two decades before. But the submarine while constantly growing larger and more effective has yet to develop the under-water speed and the surface offensive power which would make her supersede the destroyer.

One of the early proposals of the Navy Department when war was declared was for an immense emergency fund for building destroyers to cope with the submarine peril. This fund has been utilized effectively and already many new destroyers have come into the American Navy and each day there is unofficial recognition of the launching of more fresh ships of this type. The allied and enemy powers have also devoted considerable of their naval building efforts to the construction of destroyers. It is estimated that Germany has probably added from 80 to 100 destroyers to her battle fleet, for these little vessels have appeared bearing numbers that under peace time conditions would have been given to ships which would be built in the 1919-20 building programs. England has devoted more attention to destroyers and as early as the battle of Jutland, many of

these craft were on hand, which were not listed in pre-war naval directories.

Having to combat the submarine menace the Allies naturally give more attention to destroyer construction than the enemy has, for the destroyer has proved to be the most feared enemy of the submarine. The destroyer bridges the gap in modern naval construction that lies yawning between the light cruiser and the seagoing submarine. It fills in between these two types and performs duties for which neither are completely fitted.

The destroyer has the advantage of superior mobility and greater offensive power in general engagements. That this latter strength is superior to that of the submarine is evidenced in direct contest, by the fact that more submarines have been sunk by destroyers than destroyers by submarines. The submarine is a formidable menace to heavy surface vessels more than it is to destroyers, because of their deeper draft which makes them more susceptible to torpedo attack. As a result of this the heavy ships now depend on destroyers to ward off torpedo attacks.

The destroyer is also more formidable against heavy ships in a pitched naval battle than the submarine. For example, in the battle of Jutland which is our one outstanding example of a purely modern naval battle, it was demonstrated that as a weapon against capital ships the destroyer was superior to the submarine. No capital ship fell a victim to a submarine, but several were sunk by the active destroyer.

The destroyer is invaluable in rendering assistance to a battle squadron. It can blind and confuse the enemy gunners by the use of the smoke screen which is also an effective weapon of the destroyer when doing convoy duty. It can beat off torpedo attacks on the surface or from submarines, or it can dash in against the enemy line, attack him with torpedoes, and speed out before being struck. The submarine has not been developed to do any of these things effectively, because of its more limited maneuvering power, lower speed and greater vulnerability.

The destroyer is a type that has had a tendency toward uniformity in all navies. There has been less variation in the general lines than in any other kind of vessels. The displacement of the destroyers built by naval powers just previous to the war ranged about 1000 tons, the speed was from 29½ to 35 knots and the armament generally included several guns of about 4-inch caliber and torpedo tubes. In minor details there was naturally some divergence. The British tended to make the destroyer a gun-boat and carried only about six torpedo tubes. The Germans laid stress on the torpedo with only a couple of guns of low velocity. In the United States both defensive elements were worked for, and the 1914 type had 12 torpedo tubes and four 4-inch guns.

The Bouclier type of the French compromised on these features and this class varied between 690 and 900 tons displacement, and were equipped with four tubes and two 4-inch and four 9-pounder guns. The same ship made 35.4 knots, a speed that was regarded as extremely high at that time.

Italian naval constructors followed lines of their own as Italy has in most of her war vessels and military weapons. The *Indomito* type was one of the early destroyers, in 1911, with 700 tons and 35 knots. The *Carlo Mirabello* type raised its displacement to 1500 tons, but reduced the speed to 32 knots. The Italian late destroyers carried 4.7-inch guns, but usually had only three torpedo tubes.

Russia developed one of the most powerful types of destroyers known, following the lines of their model ship the *Novik*. The *Novik* was 338 feet in length, displaced 1260 tons and had the speed of 37.3 knots developed from engines of 40,200 horse-power. She carried four 4.1 quick firers, several lighter guns and had six torpedo tubes mounted in pairs. She had a wide range of action because of her capacity for fuel oil. Thirty-six of this type were under construction in Russia when war was declared.

Chile, among the smaller naval powers, always interested in things maritime, developed the destroyer considerably. Most of the Chilean boats

were built in Great Britain and they approached the light cruiser type. Vessels which she ordered in 1910 displaced 1430 tons and made 32 knots. They had six 4-inch guns and three torpedo tubes. High freeboard and plenty of room for the crew with a fuel capacity of 500 tons, made these ships very habitable and seaworthy, features which most destroyers often sacrifice to speed and mobility.

These illustrations show that while displacement has been gradually increased until many destroyers merge into the third-class cruiser type, the general tendency has been to keep the size within the 1000-ton limit. Enlargements have been mainly with the desire to give the craft heavier armament and greater seaworthiness.

The destroyers of the United States have in their latest manifestations been somewhat larger than the European type, since America in building her naval ships has always figured on the fact that any potential foe would most likely be a considerable distance from her shores. The destroyer from America must therefore be a vessel that could go to a foreign battleground, be provisioned with fuel and supplies to do duty there and possibly be able to return to her home port for further supplies. The latest pre-war vessels in the United States were the *Conyngham, Wilkes, Jacob Jones,* and *Wainwright.* These ships were between 1125 tons displacement and 1224 tons. Their speed averaged about 29 knots or slightly over and their offensive armament consists of four triple torpedo tubes, for 21-inch torpedoes and four 4-inch rapid guns, which throw a 33-pound shell.

Later destroyers authorized before war was declared were of 1125 tons displacement and made a speed of 30 knots, with comparatively the same armament as the somewhat earlier types. An improvement in seaworthiness has been made by the Navy Department recently, by the introduction of the flush-deck destroyer. Formerly the destroyer was featured in almost every country by the raised forecastle. The new ship has the advantage of permitting the heavy seas to sweep freely over the deck, thus causing less friction and rolling and less shipping of water in rough weather.

The destroyer has developed as the result of the invention of the torpedo, coming into being first in the Civil War, when Lieut. W. B. Cushing used a spar torpedo and a launch to sink the Confederate ship *Albemarle.* The Confederates had used a sort of torpedo mine early in the war and though disapproving of these naval tactics the Federal government adopted the spar torpedo as an adjunct to the navy.

The first torpedo-boats from which come the modern destroyer were very small, the theory being that they would come up on the enemy under cover of darkness. The Whitehead torpedo brought about the enlargement of the vessels carrying them. Then a weapon to attack the torpedo-boats was developed and the modern destroyer was under way.

Late naval strategy calls for four destroyers to one capital ship for safety and correct naval warfare. The United States did not develop destroyers in this proportion though the general board frequently recommended that such be done. To-day we are making up for these cuts in the naval program by rushing destroyers for service abroad.

Starting out with a spar torpedo as her only weapon, the destroyer of to-day has almost every known variety of offensive weapon designed mainly for attack against snbmarines. The triple torpedo tubes totalling usually 12 tubes in number on American ships, the light guns which can outrange the submarines' batteries, the depth bomb, and the non-ricochet shell make the ship formidable. In fact probably only an improvement of the destroyer's microphone for detecting a submarine under water, stands in the way of permitting this craft to clean out the U-boat with ease.

A gratifying feature of the new destroyer program with which America is making up for lack of preparedness in this line, is the increased speed with which the new vessels are being turned out. Whereas the pre-war speed for making destroyers was about two years or 18 months, to-day

the record made recently for the new type destroyer was 51 weeks from the laying of the keel. With records of this kind in construction, it will not be long before a most formidable fleet will be on hand to guard the new merchant marine and to assist the battle fleet when the time for a naval engagement comes.—*The Naval Monthly*, May.

LESSONS OF THE WAR

LOSSES IN NAVAL WAR.—By Percival A. Hislam (British).—The character of naval losses has undergone a considerable change since the last great wars in which we were engaged, and to this a variety of causes have contributed. The substitution of steam for sails has rendered ships less liable to the ordinary perils of the sea; while it is not necessary for us to-day, as it was in Nelson's time, to keep in commission a large number of small ships for the special purpose of dealing with the enemy's privateers. To a very large degree the U-boat stands to-day as the modern, degenerate representative of the old-time privateer, and the destroyer counterparts the light craft that used to be employed for hunting down the hostile corsairs; but while the destroyer is a great advance in seaworthiness over the 8- to 16-gun vessel of the beginning of last century, the losses among this type have been, as one would expect, relatively heavy. The greatest revolution of all in the cause of naval losses is due to the change in the material used in ship construction and to the development of methods of attack. Speaking comparatively, the wooden warship was unsinkable in action. There was no means of attacking her beneath the water-line, and the damage caused by chance shots striking between wind and water could usually be made good from within with very little trouble; while in the case of shot striking above the water-line, their only chance of doing considerable material damage lay in the possibility of causing a fire. Ships that were badly knocked about and had lost their masts were frequent victims to bad weather before their injuries could be made good; but the general chance of a vessel being actually sunk in action is indicated by the fact that out of 162 units of the Royal Navy lost in the five years 1804-1808, inclusive, only two were lost in this way. One was the 10-gun hired cutter *Constitution*, Lieut. J. S. A. Dennis, sunk in August, 1804, by a 13-inch shell which crashed through her deck while she was engaging the enemy batteries and flotilla at Boulogne; and the other was the *Rapid*, 12, Lieut. Henry Baugh, sunk by batteries in the Tagus in May, 1808. Within the same period two of our vessels were sunk to avoid capture. In the present war this has been done by the Russian *Prut*, and by the German disguised minelayer *Meteor*, which after sinking the British auxiliary *Ramsey* in the North Sea on the 8th of August, 1915, destroyed herself the following day to avoid capture by a squadron of our cruisers. The British steamer *Turritella*, made prize by the raider *Wolf* and converted into a minelayer, was similarly destroyed. It is understood that this variation of hari-kari is observed with unusual determination by the crews of enemy submarines.

The capture of a commissioned ship has been a very unusual feature of the present conflict, and this for several reasons. In the old days—the Nelsonian period—the main object in battle was to disable the enemy's armament, and his destruction was probably never aimed at deliberately. This, it will be remembered, is the theme of Sir Reginald Custance's "Ship of the Line in Battle," in which it is argued that the "defeat" of the enemy and the disablement of his guns are the objects to be sought. It is much to be doubted, however, if in any naval action of the present war a single shot has been fired with the object of disabling the armament or "defeating" the crew of an enemy warship. The objective is always the ship—and her destruction. It could hardly be otherwise, seeing the ranges at which modern engagements may be fought, the urgent need for the most rapid fire possible consistent with accuracy, and, more important

than anything else, the fact that the destruction of the ship involves *both* the defeat of its crew and the disablement of its guns, and is a much more practicable proposition from the gunnery point of view than an attempt to demoralize a ship's company with a hail of small projectiles or to knock a turret over the side. The material, structure and contents of a modern ship of war all tend to make her destruction a relatively simple matter compared with the task that faced the gunners of a hundred years ago, while torpedoes and high explosive projectiles have helped considerably to banish the word "surrender" from the vocabulary of modern navies. A ship's armament may be annihilated and her crew demoralized; but there is rarely or never an appreciable interval between the one or the other and the plunge to the bottom. The best remembered case of surrender in the present war is that of the *Emden*, which gave in to the *Sydney* after suffering heavy losses and being driven aground. In at least one official document the incident is referred to as the "capture" of the *Emden*, but "destruction" is the word commonly used. A more remarkable capture, accomplished without the firing of a shot, was that of the German gunboat *Komet*, taken by surprise in New Guinea by the late Lieut. Commander J. M. Jackson and a boat's crew from the Australian auxiliary vessel *Nusa*. The *Komet* is now in service. The capture and recapture of the gunboat *Firefly* on the Tigris will also be recalled.

Nothing came as a greater surprise in the early days of the war than the number of officers and men involved in the unfortunate incidents that occurred. Not a soul was saved from the *Good Hope* or the *Monmouth*, while over 1400 lives were lost when the *Aboukir*, *Hogue* and *Cressy* were torpedoed. It has been stated that in the naval campaigns of the Russo-Japanese war the combined losses on both sides were only 1883 killed and drowned, and 1809 wounded; but the figures do not seem to carry conviction. Here, however, are the losses sustained by the British Fleet in five of its most renowned fights of the sailing days:

	Killed	Wounded
1st of June, 1794	290	858
St. Vincent	73	227
Camperdown	203	662
Nile	218	678
Trafalgar	449	1242

The total of killed in these five victories did not exceed by more than a hundred the loss of life involved in the destruction of a single British battle cruiser, the *Queen Mary*, in the battle of Jutland Bank. According to a table published in "Naval Power in the War," by Lieut. Commander C. C. Gill, U. S. N., the German Admiralty claim that the British loss in this action amounted to 117,150 tons and the German to 60,720 tons, while the personal losses are given as 6105 and 2414, respectively. There is no means of testing the latter; but it may be pointed out that in the list of officers and men killed in action, printed with the quarterly "Navy List," our total losses for the month of May, 1916, were 324 officers and 5348 men. The aggregate for the month, therefore, does not equal the German claim for the Jutland battle; which, of course, undoubtedly accounts for practically this entire list. It will be observed from the above table that in the old sea fights the wounded outnumbered the killed in the proportion of just about three to one. Under present conditions the tables are most emphatically turned, the principal reason being the poor chance a wounded man has of being saved from a doomed ship.

The latest edition of *Fighting Ships* contains a pretty complete list of the known naval losses of the various powers during the war. In preparing the following analysis I have included in addition the armored cruiser *Drake*, torpedoed by a submarine on the 2d of October, 1917, and the monitor *Raglan*, destroyed by the gun-fire of the *Goeben* on the 20th of January, 1918. These vessels are not included in the list referred to.

The table which follows represents armored ship and cruiser (not light cruiser) losses only:

British Armored Ship Losses Reported in the War Down to the 23d of February, 1918

Cause of loss	No. of ships	Tonnage	Percentage of tonnage to total of loss
Torpedoed by submarine.....	14	143,525	33.52
Sunk by gun-fire	10	136,885	31.98
Sunk by mines	7	76,110	17.78
Destroyed by internal explosion.	3	47,800	11.17
Torpedoed by a surface ship....	1	12,950	3.02
Wrecked	1	10,850	2.53

It will be seen that the two forms of under-water attack—the sinking of the *Goliath* by a Turkish destroyer being omitted from this category—accounted for 21 ships out of 36, and for 51.3 per cent of the destroyed tonnage. It should be pointed out that in spite of very definite official statements, a good deal of doubt is still entertained in many quarters regarding the actual cause of the loss of the *Hampshire*, which is stated to have been mined; and there is some difference of opinion, also, as to whether the *Irresistible* and *Ocean* were sunk by mines (as officially recorded), or by torpedoes, possibly dirigible, on the Brennan principle, discharged from concealed shore stations in the Dardanelles.

The principal fault with the above table is that it includes only three groups—or, perhaps, one should say but two—of the many that go to make up a navy. It is, however, impossible to extend it with any real satisfaction owing to the insufficiency of the published facts regarding the minor types, particularly in regard to tonnage; but the inclusion of these types would make a considerable difference both to the aggregate and the distribution of the causes of loss. The following, for instance, is a statement of the losses of armed merchantmen announced by the Admiralty during 1917:

Laurentic, believed mined; *Hilary*, torpedoed by submarine; *Otway*, torpedoed by submarine; *Champagne*, torpedoed by submarine; *Orama*, torpedoed by submarine; *Stephen Furness*, torpedoed by submarine; *Arbutus* and *Grive*, foundered after being torpedoed by submarine; *Osmanieh*, mined. Under-water attack accounted for the whole of these ships, and as, apart from drifters and trawlers, we lost from gun-fire in the same year only the seaplane carrier *Ben-my-Chree* and the destroyers *Strongbow*, *Mary Rose*, and *Partridge*, it is obvious that the inclusion of all classes of vessels would effect an appreciable change in the complexion of the table. It should also be pointed out that of the loss by gun-fire shown above, no less than 76.5 per cent of the total tonnage was lost in the Jutland fight (six ships of 104,700 tons), so that another action of this sort—the probability of which appears to grow less with the prolongation of the war—might be reasonably expected to send up the gun-fire total considerably; unless, of course, we should have the good fortune to discover, what so many navy critics appear to demand, an admiral who can win battles without sustaining losses.

The estimate of losses is, of course, one of the most essential duties of a staff, for the decision as to whether a certain operation shall be undertaken must inevitably rest in the end upon the comparison between the results to be achieved and the price to be paid in attaining them. The first report of the Dardanelles Commission is the only document so far published which gives us an actual insight into the working of the staff system in the navy—or of what passed for a staff system in the early months of the war—and it contains two interesting references to this very subject. Lord Fisher had stated that in his opinion he attended meetings of the War

Council simply that he might answer questions if he was asked. The question was put: "And were they ever asked?" To which he replied: "They were sometimes, because I was asked how many battleships would be lost (in the attack on the Straits), and I said 12." The War Council thus knew, from the highest professional advice they could obtain—that of the First Sea Lord—that the forcing of the Dardanelles would cost 12 battleships. In full possession of that knowledge, they decided upon that operation; but they quickly dropped the whole business—that is, the purely naval attack—as soon as we had lost three. This is one of the difficulties inseparable from the constitutional policy of leaving high decisions in the hands of civilians. They neither understand the advice they receive from the experts nor appreciate the fact that success in war cannot be achieved without paying the due price for it. They are willing to try things as a speculation so long as they can back out when their nerve begins to give; and when the *Ocean*, *Irresistible* and *Bouvet*—25 per cent of our expected losses—went down in the Dardanelles, they probably recollected suddenly Lord Fisher's warning that "even the older ships should not be risked, for they cannot be lost without losing men, and they form the only reserve behind the Grand Fleet." Of course, Mr. Churchill produced "an elaborate analysis" of comparative naval strength, conclusively showing that Lord Fisher was a querulous old gentleman whose fears were groundless and that we could quite afford the probable losses; but in spite of this the whole business was dropped like a hot poker after the first day's losses. Mr. Churchill has since put the blame for this upon the public, who are said to have been staggered by what was happening; but if politicians have any value at all in this sort of work it should surely be as a guide to how the electorate, which they know so well, is likely to behave in a particular set of circumstances.

One of the notable features of the war from the standpoint of the present article is the steady increase in the loss of destroyers. This is strongly shown in the following half-yearly analysis, which is not based exclusively upon official announcements. The information embodied in it has been accumulated from a variety of sources.

British destroyer losses
(For explanation, see below)

Half-year	A	S	M	W	C	Total
Aug. '14–Jan. '15	–	–	–	1	–	1
Feb. '15–July '15	–	1	1	1	–	3
Aug. '15–Jan. '16	–	–	2	1	–	3
Feb. '16–July '16	8	–	1	–	2	11
Aug. '16–Jan. '17	3	–	1	–	2	6
Feb. '17–July '17	1	1	8	–	2	12
Aug. '17–Jan. '18	3	3	4	3	2	15

Explanation.—"A" = sunk in action with surface ships; "S" = sunk by submarine; "M" = sunk by mine; "W" = wrecked; "C" = sunk in collision.

The "steady increase" referred to above will be the more marked if one rules out the eight vessels sunk in the Jutland battle; but even with those included the losses for the last two periods covered were greater than those of the first five. In the case of such vessels as these, which are constantly at work discharging all sorts of functions under all sorts of conditions in all sorts of places, a great deal will naturally depend upon the number in commission, and although nothing official has transpired on this particular subject, there is very good reason to believe that we have at least twice as many destroyers in service to-day as we had in the first month of the war. Such an increase legitimately permits of greater risks being taken; and it also means that when there are mines about there is a greater chance of one of them being hit, and that there is an increase in

the number of targets available for enemy submarines. It is, in short, impossible to judge of the real significance of these destroyer losses without knowing the number over which they are spread and the work they have been doing. The improvingly satisfactory position in which, according to Mr. Lloyd George, Sir Eric Geddes and Lord Jellicoe, we find ourselves with regard to the submarine menace is very largely due to the work of our destroyers, and only those who can see both sides of the ledger can balance up the profit and the loss and see where the real truth lies. It would be worth a very great sacrifice to overcome the submarine menace, and certainly the advance in our destroyer losses is far from disproportionate in comparison with the fact, of which we have been officially assured, that towards the end of 1917 the destruction of U-boats was proceeding at four times the pace we reached in the previous year.

In the last period covered in the above table the number of war vessels of all classes announced by the Admiralty as having been sunk by submarines was 18, if we include the three destroyers lost in the North Sea on the 22d of December, while in the previous six months corresponding (August, 1916, to January, 1917) the number was only six, and this included the *Nottingham* and *Falmouth*, which were operating with the Grand Fleet to meet the German sortie of the 19th of August, 1916, and also the battleship *Cornwallis*, sunk in the Mediterranean. It seems highly probable that there is a distinct and direct connection between, on the one hand, the growing success of the campaign against the U-boat and the reduction in the rate of loss of British merchantmen, and, on the other, the increase in the loss of warships through under-water attack. We know, for instance, that the convoy system was brought into general use during the early half of last year, and there is no doubt that this tends very appreciably to increase the risks run by warships. Indeed, it may be said that it is the purpose of the convoy system to shift the burden of risk from the merchantmen to the warships escorting them. In convoying through areas infested by submarines, it is the object of the escort to keep the U-boats at such a distance from the convoy that the latter cannot be attacked. In other words, the escort becomes a screen between the enemy and the merchant ships; and although the war vessels and their personnel are much better adapted for dealing with submarine attack, it follows that their chances of being torpedoed are increased in much the same ratio as those of the merchantmen are reduced. The attacks on the North Sea convoys in October and December last, resulting together in the loss of three destroyers and a number of merchantmen and armed trawlers, did not arise from any failure of the convoy system. The merchantmen were provided with an escort which, in the absence of evidence to the contrary, we may presume was adequate for its particular purpose, namely, their protection against submarine attack. For the checkmating of other forms of attack, other arrangements were made, and it was these which broke down, leaving the destroyers and trawlers exposed to an onslaught the like of which it was never expected they would encounter. At the moment of writing only one official announcement has been made regarding the torpedoing of an escort vessel, this being the *Mechanician*, which stranded and became a total loss in the channel after being "submarined" on the 20th of January last. It was not stated that she was accompanying a convoy at the time.

Reference may fittingly be made in this article to the loss of merchant shipping—a subject which even yet is not generally associated in the public mind with the shortage of food and the varied activities of Lord Rhondda. The first declared enemy campaign against merchant shipping opened on the 18th of February, 1915, and in the 35 succeeding weeks over which regular returns were issued by the Admiralty, we lost a total of 175 ships—an average of exactly five a week. The so-called "unrestricted" campaign began on the 1st of February, 1917, but the weekly official returns began, as before, on the 18th of February. The following table

summarizes our losses quarter by quarter for the first 52 weeks of this phase:

Sunk	1600 tons and over	Under 1600 tons	Fishing vessels	Total
1st 13 weeks	269	121	103	493
2d 13 weeks	237	52	45	334
3d 13 weeks	159	74	12	245
4th 13 weeks	157	48	21	226
Total	822	295	181	1298

U-BOAT'S BEST HARVEST FIELD.—In an article in the Stockholm *Aftonbladet* of March 24, Dr. K. A. Melin states that no less than 1650 vessels were sunk in the barred zone around England and France during the first year of Germany's unrestricted submarine warfare. Along the west coast of England 580 ships were sent to the bottom, while 430 were sunk in the English Channel itself. One hundred and seventy vessels were lost in the approaches to the English Channel and 270 along the east coast of England. Along the French coast only 200 vessels have been lost, which shows that the main effort of the German submarines has been directed against British shipping. Dr. Melin has not attempted to estimate the number of vessels lost in the Mediterranean area.—*Nautical Gazette*, 11/5.

ATLANTIC

U-BOAT IS LIFTED OUT OF WATER BY WARSHIP'S SHELL.—The sinking of a German submarine by an American warship with a shot which lifted the U-boat completely out of the water and broke her in two, was reported by officers of the warships on their arrival here to-day. Because of the fine work of the gunners, the crew of the vessel received an additional furlough of 10 days.

On the voyage over, the warship, which previously was reported from German sources as having been wrecked, sighted three submarines and the gunners sprang to their guns. The first two shots from the warship, fired in quick succession at the nearest enemy, missed the mark, but the third went home. It caught the U-boat just below the water-line and so great was its force that the submarine was lifted out of the water. In another moment her back broke, she doubled up and sank to the accompaniment of a chorus of yells from the warship's crew.

No survivors were seen in the water and the other submarines dived, as the destroyed submersible disappeared, and they did not reappear.—*N. Y. Herald*, 11/5.

TACKLED DEADLY BOMB.—*Boatswain's Mate Probably Saved Converted Yacht From Destruction.*—How John Mackenzie, a chief boatswain's mate in the Naval Reserve, by extraordinary heroism saved the converted yacht *Remlik*, on patrol service in European waters, was told to-day in an announcement by Secretary Daniels that the Navy Department had awarded Mackenzie the medal of honor and gratuity of $100.

During a heavy gale December 17, a depth charge weighing several hundred pounds broke from its fastenings at the stern and went sweeping about the deck. As officers and crew watched the bomb, some one saw the safety pin fall out of the charge, making it a source of serious danger to the vessel and crew. Mackenzie, realizing the danger, shouted: "Watch me; I'll get it" and dashed down the deck flinging himself upon the charging cylinder.

Three times he almost had his arms about the bomb, but each time the seas tore it from him and once almost crushed him. He stuck to his task, however, and on the fourth attempt, got a firm grip on the cylinder,

heaved it upright on one of the flat ends and held it down until lines could be run to him and he and the bomb safely lashed.—*Baltimore Sun*, 29/4.

SEAPLANE CREW BATTLES SHARKS 18 HOURS.—Lieutenant Arthur Laverents, a naval aviator, and C. C. Cotton, his observer, arrived at an Atlantic port yesterday following a narrow escape from drowning and man-eating sharks last Sunday when their seaplane broke and they were forced to alight on the ocean sixty miles out from Miami, Fla.

For 18 hours the men drifted on their seaplane, acting as acrobats to prevent it from overturning when seas were rough and fighting all the time to keep sharks away. Luck was with them Monday morning, for they were sighted by an American steamship. The crew of the vessel also rescued the seaplane, which was hoisted to the deck and turned over to the naval authorities at the Atlantic port.

The story told by Lieutenant Laverents was that he and Cotton began their flight at noon last Sunday. They arose to 2000 feet. Suddenly, when 60 miles out to sea, it was discovered the engine was missing fire.

The seaplane was brought down and they tried to repair the cylinder. The gasoline tank also was leaking. Then they found they could not arise.

Sunday night was the longest either spent in their lives. Frequently huge sharks brushed against the frail craft and they had to fight them off. Finally, at six o'clock Monday morning, when they saw that the lookout in the crow's nest of the American steamship had sighted them, they were a happy pair.

Lieutenant Laverents is from Cheyenne, Wyo. He reported by wire yesterday to his commanding officer of his safe arrival and of the saving of the seaplane.—*N. Y. Herald.*

NAVY PATROL VESSEL LOST.—*The Admiral Goes on Rocks off Massachusetts Coast.*—The Navy Department is advised that the *Admiral*, scout patrol vessel No. 967, ran on the rocks off Scituate, Mass., last night, and is a total loss. All the officers and crew were saved, and considerable small material was taken off the vessel.

The *Admiral* was a converted yacht, which, before being taken over by the navy, belonged to Gordon Dexter, of Boston.—*Official Bulletin*, 27/3.

U. S. S. "ZAANLAND" SUNK IN A COLLISION AT SEA.—The Committee on Public Information issues the following:

The Navy Department is informed that the U. S. S. *Zaanland* was sunk in collision at sea on May 13. All aboard were rescued, and will be returned to the United States.

The *Zaanland* was a cargo carrier, one of the Dutch ships taken over by the United States Government, and was 8700 tons dead-weight. It was commissioned and manned by the navy for army account.—*Official Bulletin*, 17/5.

U. S. S. "PARKER" MEN PRAISED FOR "GLENART CASTLE" RESCUES.—Secretary Daniels has commended the following men of the U. S. S. *Parker* for heroism in their effort to rescue the survivors from the steamship *Glenart Castle*, which sank on February 26, 1918:

John C. Cole, quartermaster, second class, United States Naval Reserve Force, and Jonathan T. Newman, seaman, United States Navy, seeing the condition of one of the survivors, requested permission to go to his aid. Permission was granted Cole, who succeeded in swimming to the man and holding him up. The strain of holding up the man in the cold water and choppy sea nearly exhausted Cole. Newman, seeing his condition, jumped overboard, but was ordered back by the executive officer, who felt that Cole would probably be lost and that further sacrifice would be useless.

Cole held on to the survivor, and both were finally rescued.

Roy E. Hoffses, chief boatswain's mate; Francis W. Beeghley, yeoman, third class; and James H. Quinn, coxswain, United States Navy, boarded a fragile raft that was smashing into the ship's side, secured the survivors and pushed them aboard, at considerable personal risk.

David L. Morgan, electrician, third class (radio), and Thomas F. Troue, United States Navy, were constantly in the water, pulling out survivors, all of whom were totally helpless. These men have also been commended for using good judgment when necessary to take risks, and for not hesitating on any occasion.

The fourth officer of the *Glenart Castle* having fallen overboard, Wilbur W. Matthews, ship's cook, second class, and David Goldman, machinist's mate, second class, United States Navy, jumped overboard, put a line around him, and aided him to the ship's side, where he was hauled aboard.—*Official Bulletin*, 16/5.

ABROAD.—In the face of bitter winter gales, American submarines, primarily designed for operation off the home coasts, have crossed the Atlantic to engage in the common fight against German U-boats. They are now aiding allied naval forces, as are American destroyers and American naval airmen, and they have been in the war zone for some months.

Secretary Daniels revealed the fact that the submarines had gone "over there" in his address at Cleveland at a Liberty Loan celebration, but gave no details. It is now possible, however, to tell for the first time of the mid-winter passage of the boats across the seas in the face of the most severe weather known in years. In the perilous passages, the best traditions of the service have been maintained.

The first submarine left in early winter. No hint appeared in the papers, and, in fact, until Secretary Daniels spoke, no word of the participation of the under-water boats in the war against Germany had been published.

The navy had some experience with long-distance work with submarines on which to draw. Boats have been sent to the Philippines, to Hawaii and to Panama, but always in mild seasons and with plenty of time for precautionary steps.

This time, however, they were to go in a terrible winter, with the Atlantic in its ugliest mood. The steps taken to get them across cannot be disclosed, but the fact that the department has no disaster to record is pointed to as proof of their sufficiency.

In mid-December others got started. While it was fair on sailing day, ahead of the submarines a 100-mile gale was brewing. Into it they plowed, rolling and tumbling.

Even when tow lines parted in some cases, unknown to the tugs and accompanying craft, the submarines battled forward alone. A majority of them reached their destination under their own power, ready for duty.

Some of the boats were driven far from their course. They showed up at different ports, but promptly put to sea again and reached their station.

One boat was the hard luck vessel of the lot. Separated from the flotilla in the first storm and its compasses out of order, it turned homeward, only to strike two more gales in quick succession. However, it made port successfully and undamaged.

With new fuel and supplies aboard and with a man or two, worn out by the long struggle with the elements, replaced, in a few days the boat put to sea again. It went through that time, despite a fourth gale it encountered.—*Naval Monthly*, May.

U. S. TRANSPORTS CRASH.—Secretary Daniels authorized the following statement:

"Two transports, which were damaged in a collision at sea several days ago, have arrived safely at an Atlantic port. The two vessels were in a convoy and were running without lights when the accident occurred.

Neither was seriously damaged, but both were ordered to return to port for repairs. No lives are reported lost.

"A board of inquiry will be appointed to make a thorough investigation of the accident."—*Washington Evening Star*, 27/4.

LINER ESCAPES U-BOAT.—A large French transatlantic liner which arrived here to-day was unsuccessfully attacked by a submarine when two days out from a French port. The torpedo passed astern and the merchantman gave battle. Cruisers convoying the liner joined in the fight and the U-boat fled with several of the warships in pursuit.

Whether the submarine was sunk was not known by any of the 285 passengers aboard the merchantman. The attack took place while the passengers were dining at 7 o'clock at night.—*Evening Star*, 29/4.

BIG BRITISH VESSEL ROUTS A U-BOAT IN MIDOCEAN FIGHT.—A British steamship which prior to the war was considered one of the best aboard which to cross the ocean, arrived yesterday at an Atlantic port with a story of a daring attempt by a German submarine to slide under the flock of destroyers convoying her and launch a torpedo. Luckily, the periscope of the Hun craft was discovered in time and a shower of shells from the guns of the steamship caused her to hurry away.

Passengers on board the steamship said, however, that before the final plunge of the submarine she let go one torpedo when a mile away, but it went wild, showing the Huns were in great fear of death and were excited. Destroyers closed about the spot beneath which the periscope was seen, but it was unknown whether the depth bombs thrown overboard destroyed her.

The steamship was one of the several under convoy from a French port when attacked and quickly changed her course. After discharging several Canadian troops on furlough the steamship headed for an American port, where the rest of the passengers were landed. Some of these were Australians.—*N. Y. Herald*, 5/3.

SHIP'S ARMED GUARD REPORTS ENCOUNTER WITH SUBMARINE.—The Navy Department authorizes the following:

The commander of the armed guard on the steamship *Tidewater* reports to the Navy Department that on March 17, about 11.30 p. m., a submarine was sighted off the starboard bow, heading toward the vessel about 150 yards off. As the ship turned it missed the submarine by not more than 20 feet. The U-boat was then submerging. The ship's guns were brought to bear and the first shot hit some distance ahead of her wake.

"The pointer fired the second shot," says the report, "and had what the captain, the chief engineer and myself, and other members of the crew called a clean hit and was satisfied that it was effective. The third shot was fired by the boatswain's mate in charge of the after gun's crew, having her spotted and firing in the position she last submerged in. We resumed our course and commenced zigzagging, standing by for an attack, but the submarine did not appear again. We made all preparations for an attack at daybreak, but there were no signs of a submarine."—*Official Bulletin*, 8/5.

A German submarine bombarded Monrovia, Liberia.—*Army and Navy Gazette*, 20/4.

TWENTY-NINE LOST ON "FLORENCE H."—Capt. F. J. Butterfield and all the deck officers of the American steamship *Florence H.* are now believed to have lost their lives when that ship was destroyed by an explosion April 17, while off the French coast. A list of survivors received here to-day by cable from the American consul at Brest does not contain their names. It is also shown that only two of the engine-room officers escaped uninjured, the others being reported as badly burned.

A checking up of the cabled list with the record of the crew filed with the United States Shipping Commissioner here when the *Florence H.* sailed shows that out of 56 men in the civilian crew 29 are dead or missing, 12 are in hospitals badly burned, 2 are slightly burned and only 13 escaped uninjured.

There is a possibility, however, officials of the United States Shipping Board here said, that some of the missing may yet be accounted for, but as the *Florence H.* was near a port when the explosion occurred, this hope is remote. Chief Engineer James B. Watson and First Assistant Engineer Strickland are among those who escaped injury, the second and third assistants being badly burned.

In addition to the civilian crew, there were on board 23 men of a naval guard, six of whom have been reported as survivors, through the Navy Department at Washington.

The *Florence H.* sailed from Philadelphia March 30, with cargo, part of which was explosives. A recent cable advice from Paris said that the explosion was believed to have been caused by a bomb planted on the ship before she sailed.—*Baltimore Sun*, 27/4.

The American steamship *Lake Moor*, sailing on her maiden voyage with a naval gun crew aboard, was sunk by an enemy submarine in European waters about midnight April 11 and 5 officers and 39 men are missing, the Navy Department announced to-night.

Five officers, including Lieut. Commander Kinchen J. Powers, U. S. N. R. F., and 12 enlisted men have been landed at an English port.—*Baltimore Sun*, 21/4.

COLLIDES AT SEA, SINKS.—The American steamship *Westerly*, one of the new ships built by the Emergency Fleet Corporation, was sunk in a collision Sunday off the French coast, according to information received in shipping circles. All aboard were saved.

The *Westerly*, a vessel of about 5000 tons, launched on the Pacific coast in February, was returning to the United States after having completed the first half of her maiden trip to Europe.—*Evening Star*, 30/4.

AMERICAN STEAMER "TYLER" TORPEDOED AND SUNK MAY 2.—The Navy Department has received from Vice Admiral Sims a dispatch stating that the American steamer *Tyler* was torpedoed and sunk May 2, 1918, in European waters. Survivors of the vessel were landed at a French port. Six of the merchant crew, including the third assistant engineer, and five members of the naval armed guard were lost.—*Official Bulletin*, 8/5.

NOTE.—The names of the members of the armed guard on the *Tyler* are being checked up by the Bureau of Navigation, and will be made public as soon as this is completed.

STEAMER "NECHES" SUNK BY TORPEDO, RETURNING WITHOUT CARGO, BUT ALL ON BOARD REPORTED SAFE.—The following statement is authorized by the Secretary of the Navy:

The War Department has received information that the *Neches*, a cargo carrier of 7175 tons, was torpedoed and sunk on the night of May 14 or early morning of May 15.

All on board are reported saved.

The vessel was returning without cargo.

It is believed that the vessel carried a crew of about 125 men.

No troops were on board.

The *Neches* was under charter by the United States Shipping Board. It was a steel ship, built in 1914, and had a speed of about 14 knots per hour. —*Official Bulletin*, 11/5.

MYSTERIOUS ADVERTISEMENT IN A SOUTH AMERICAN NEWSPAPER HINTS THE "CYCLOPS" WAS SUNK.—A story has been brought to the United States to the effect that, two weeks after the United States collier *Cyclops*, which has been given up as lost, left Barbados, on March 4, an advertisement was published in a Portuguese newspaper at Rio Janeiro announcing a requiem mass would be celebrated for the repose of the soul of Alfred L. Moreau Gottschalk, "lost when the *Cyclops* was sunk at sea." The story was brought by a British steamship arriving yesterday at an Atlantic port from Brazil.

Especial interest attaches to the advertisement, as it was published long before the United States Navy Department at Washington, on April 15, announced that the collier, with an immensely valuable cargo of manganese and 333 persons on board, was missing.

Efforts have continued since the appearance of the advertisement by the United States and Brazilian secret agents to discover the identity of the persons responsible for the advertisement, as it is believed they possessed information that the *Cyclops* never would reach the American port for which she was bound when she left Rio de Janeiro.—*N. Y. Herald*, 6/5.

SECRETARY DANIELS STILL HOPES TO FIND THE "CYCLOPS."—Although two months have passed since the naval collier *Cyclops* disappeared, Josephus Daniels, Secretary of the Navy, said to-day the department still holds hopes of solving the mystery, and has not yet officially recorded the vessel as "lost."

Systematic questioning of fishermen and residents of islands along the route the collier would have followed from the West Indies to an Atlantic port is continuing.—*N. Y. Herald*, 15/5.

ONE FRENCH GUNNER DEFEATS HUN U-BOAT.—Heroism of French sailors, of which so little has been learned during the war, is told with the official story of the French sailing patrol boat *Goeland II*.

During one of the blackest nights of January the *Goeland II* suddenly found herself under the point-blank fire of the two guns of a German submarine. Despite the fact that the ship was torn open beyond repair, the crew rushed to their single gun and went into action. Two gunners were killed before a shot was fired from the ship; a third calmly worked the gun alone and his second shell put the submarine's rear gun out of action. The U-boat then submerged and gave up the fight.

The *Goeland II* sank and with her the captain. The second mate, gravely wounded, directed the remaining men of the crew into the boats which were floating where the ship disappeared.

The Minister of Marine has endowed the brave second mate and the third gunner with the Military Medal and cited the deed to the Order of the Army.—*Baltimore Evening Sun*, 27/4.

BIG LINER "ST. PAUL" OVERTURNS AT PIER.—The American line steamship *St. Paul* overturned while being warped around her pier here to-day, after coming from a nearby dry dock. It is believed that all persons on board, between 500 and 600 workmen, escaped, but as the vessel lies two-thirds submerged, with her bow on the bottom and her stern high in the air, the military authorities were unwilling to announce that no one perished. It was considered possible that some of the men might have been caught in the interior of the ship and drowned.

Whether the *St. Paul's* seacocks were left open or the ballast shifted, remains to be determined.

The *St. Paul*, one of the crack steamships of the American line, registers 11,629 tons gross. For many years she has been in transatlantic service, and during the war has taken to Europe and brought back as passengers many noted persons.—*Evening Star*, 25/4.

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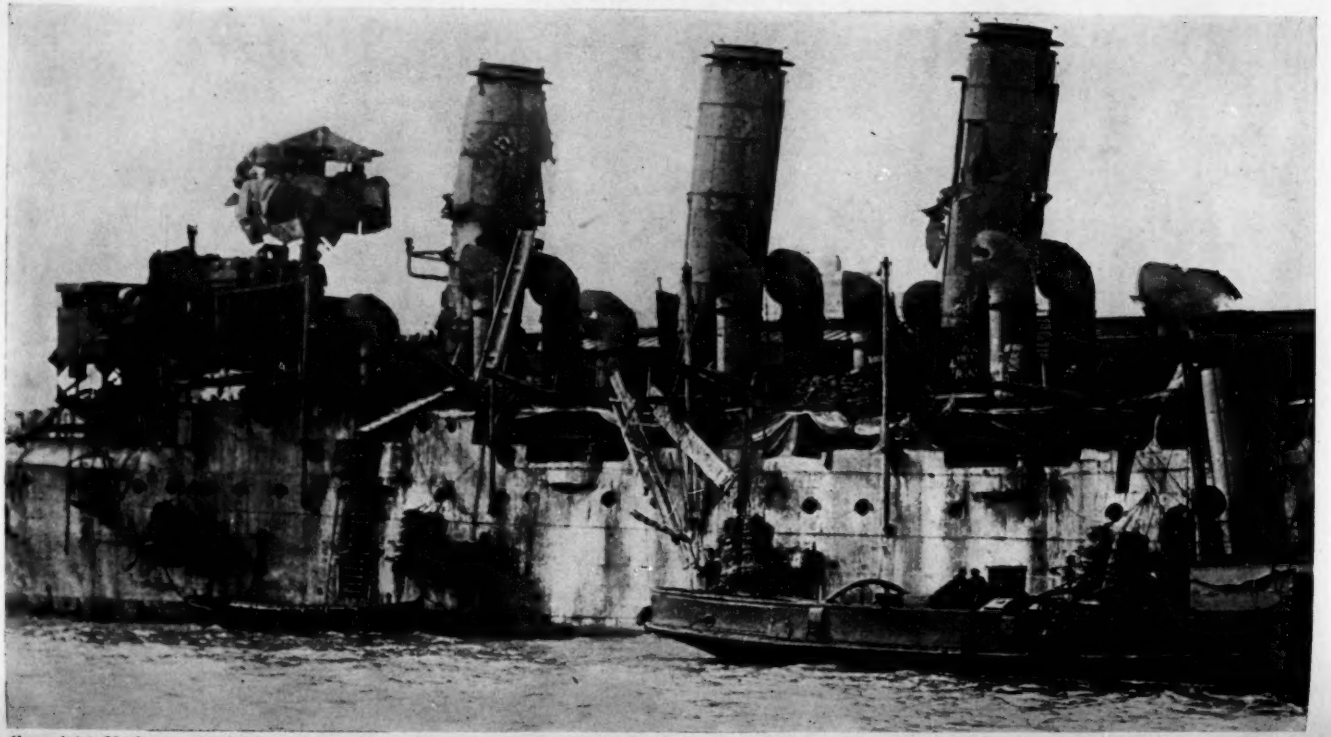
CRUISER "VINDICTIVE" BATTERED BY GERMAN SHELLS AT ZEEBRUGGE, NOW SUNK ACROSS OSTEND CHANNEL.



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THE "VINDICTIVE," PHOTOGRAPHED IN A HOME PORT UPON HER RETURN FROM SUCCESSFUL RAID AT ZEEBRUGGE.

RAISING THE "ST. PAUL."—An ash port carelessly left open was believed to have flooded the American liner *St. Paul*, sinking her at her pier. However, so far no official announcement as to the cause of the accident, which probably caused the loss of lives, has been made.

Work of raising the vessel is progressing rapidly to-day. Meanwhile investigation to definitely place the responsibility for the sinking was conducted by army men.—*Baltimore Evening Sun*, 26/4.

NORTH SEA AND CHANNEL

GERMAN SHIPS SHELL COAST OF FLANDERS.—German torpedo craft bombarded the coast between Dunkirk and Nieuport, behind the allied lines in Flanders, yesterday morning, says an official statement from Berlin to-day. The text reads:

"Our torpedo-boats on Thursday morning fired 600 shells on enemy camps and storage places between Dunkirk and Nieuport."—*N. Y. Herald*, 20/4.

KATTEGAT SWEPT BY BRITISH SHIPS.—*Ten German Trawlers Sunk.*—The Secretary of the Admiralty made the following announcement last evening: Commander-in-Chief, Grand Fleet, reports having undertaken a sweep of the Kattegat on April 15.

Ten German trawlers were sunk by gun-fire, their crews being saved by the British ships.

There were no British casualties.

Reported Fight Near the Sound.—Copenhagen, April 15.—During the last few days numerous torpedo-boats and destroyers of foreign nationality have been observed at different places off the Swedish west coast near Halmstad (in the Kattegat). This morning six destroyers were seen firing at a sailing vessel, which at last took fire. Farther out at sea smoke and flames were seen, and about 100 shots were heard.

A special telegram from Helsingborg to *National Tidende* states that a fight has taken place between English and German vessels in the Kattegat northwest of Kullen (at the northern entrance of the Sound). A number of German trawlers are said to have been sunk. German battleships then came up, and the fight continued.

Enemy Vessels in Flames.—Christiania, April 15.—A correspondent of *Aftenposten* reports from Gothenburg that destroyers of foreign nationality were observed at 5.30 this morning eight miles off the Swedish coast shelling five ships which looked like German trawlers, and which all seemed to be ablaze, while some were about to sink. At 10.50 Marstrand fishermen saw the warships speeding rapidly northwest.—*London Times*, 18/4.

BRITISH AND GERMAN LIGHT NAVAL FORCES IN A SHORT BATTLE NEAR HELIGOLAND.—British and German light forces clashed on Saturday in the waters east of the great German fortress Heligoland, the British Admiralty announced to-day. After the exchange of a few shots at long range, the German warships took refuge behind their mine-fields. The Admiralty announcement says:

"British light forces operating in Heligoland Bight Saturday obtained touch with enemy light forces, who retired behind the mine-fields. A few shots were exchanged at an extreme range. One enemy destroyer was observed to be hit. All our ships returned without casualties."—*N. Y. Herald*, 22/4.

THE ATTACK ON ZEEBRUGGE AND OSTEND.—Those critics who have been calling for a strong offensive against the German submarine bases must have received their fill of satisfaction when they read of the dashing exploit of the British Navy against the German bases at Zeebrugge and Ostend. Germany could not have been struck in a more tender spot; for her writers, both military and naval, have always tried to impress it upon the Germans that the possession of the Belgian coast is of prime

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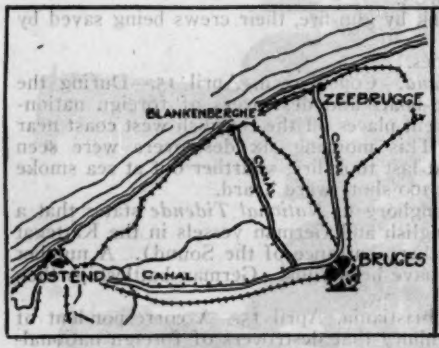
THE "VINDICTIVE," PHOTOGRAPHED IN A HOME PORT UPON HER RETURN FROM SUCCESSFUL RAID AT ZEEBRUGGE.

importance in Germany's plans for the crushing of British sea power. German hunger for the possession of the Channel ports is largely responsible for the present fierce drive against the northern sectors of the British Army in France, and should she succeed in adding Dunkirk, Calais and Boulogne to Zeebrugge and Ostend, she will fight to retain them more fiercely perhaps than for any other object in the war.

The value of the two Belgian harbors lies in their strategic relation to the English Channel and the southerly half of the North Sea. Zeebrugge is the port of the considerable city of Bruges, with which it is connected by a canal which also extends between Bruges and Ostend. These conditions render both of these ports admirable bases for submarine operations; for the craft can lie in the canal beyond range of hostile gun-fire from the sea. The approaches to both ports are characteristic of the waters of the Belgian coast, which are shoal and underlaid by shifting masses of sand through which channels lead from deep water to the harbor entrances. Zeebrugge is protected from southwest gales by a curved breakwater or mole of masonry, which is connected, at its in-shore end, with the mainland by a bridge. The entrance to the docks of the canal is formed by two smaller breakwaters with a lighthouse at the end of each. About three-quarters of a mile in-shore are the lock gates which form the entrance to the docks and to the canal.



RELATION OF OSTEND AND ZEEBRUGGE TO BRUGES.

OSTEND, SHOWING ENTRANCE AND DOCKS.

From *Scientific American* and *London Times.*

Ostend has no large breakwater, the entrance to the docks and to the canal from the sea being formed by two piers, about one-quarter and one-half mile in length, and the harbor being a tidal one, there are the customary lock gates leading to the various docks and basins.

Both Zeebrugge and Ostend have been subjected to attack from the air by the British Naval Airplane Service, and considerable damage has been done from time to time. Latterly, as protection, the Germans have built heavy reinforced concrete shelters, under which the submarines lie during their overhauling and refitting.

The expedition, which was under the command of Admiral Keyes, was most carefully organized; and the various vessels that went into the harbor were manned entirely by volunteer crews. There is some doubt as to the exact composition and size of the attacking fleet, but judging from the rather fragmentary reports which have come to hand, it looks as though the fleet of raiding ships was accompanied by a considerable force of monitors armed with 12- and 14-inch guns which subjected both bases to heavy long-range gun-fire before the raiding vessels were sent in.

The fleet detailed for the raid consisted of five obsolete cruisers from 20 to 30 years old; the *Vindictive* under command of Commander Car-

penter; two large ferryboats which formerly did service between Birkenhead and Liverpool; two old submarines filled with explosives; and several destroyers and high-speed motor-boats.

The *Vindictive* is a protected cruiser of 5750 tons and 20 knots speed, built in 1897, mounting a battery of ten 6-inch guns, and nine 12-pounders. Her complement is 450 men.

The five obsolete cruisers, loaded down with masses of concrete, were designed to be sunk across the channel entrances so as completely to block them.

The two old submarines, which were crammed with explosives, were destined, one for blowing up the bridge connecting the in-shore end of the mole with the mainland, and the other for blowing up the lock gates, and so draining the docks and basins and the canal itself.

ZEEBRUGGE HARBOR.

From *Scientific American* and *London Times*.

The plan of attack was for the *Vindictive* and the two large ferryboats to lie alongside the outer wall of the mole and throw landing parties ashore, mainly for the purpose of diverting attention from what was being done inside the harbor, and partly for the purpose of destroying the batteries and the considerable amount of military stores located on the mole. Under the cover of this destruction, three of the concreted cruisers were to make their way through the harbor and sink themselves squarely across the channel.

After the preliminary bombardment by the monitors, which was so heavy that windows were shaken in the town of Dover, some 75 miles distant, the fleet advanced behind a screen of smoke. A change in the wind lifted the smoke screen just before the fleet reached its objective, and German star shells revealed to the enemy the daring nature of the attack. The *Vindictive* reached her objective, and with lines of grappling irons managed to get ashore two out of 14 special gangways—the other dozen having been shot away—which were stretched from the ship to the elevated parapet of the mole. Over these the crew from the *Vindictive* swarmed

ashore where they were joined by other landing parties from the ferryboats. They captured the guns on the mole, and turned them on the Germans, driving them back, and covering the line of warehouses, which were set on fire by flame throwers that had been provided for the purpose. The *Vindictive* was brought under extremely heavy gun-fire, but thanks to the protection of the mole, only her upper works were shot away, and the ship remained so far intact that she was able to withdraw with the wounded and survivors.

The attack on the mole seems to have been a complete success. One of the submarines made its way to the in-shore end, and after being placed below the bridge, the explosives were touched off and the bridge with the German troops gathered upon it was blown up. Meanwhile, the other submarine seems to have blown in the seaward gate leading to the docks of the Bruges canal—one eye-witness stating that, as he left, the water was pouring out through the gates and the vessels inside were straining heavily at their moorings. This, however, has not been verified in the brief Admiralty report. The three cruisers seem to have been sunk in position, blocking the channel.

As to Ostend, the results do not seem to have been so satisfactory although both of the concreted ships were sunk, and it is believed that the entrance channel is partly blocked. The crews from the concreted ships and the submarines were picked up by fast motor-boats and carried safely back to the main fleet.

Taken as a whole, this exploit is worthy to rank with the best cutting-out expeditions recorded in naval history. It was well conceived, and seems to have been carried out with great dash and coolness. Of course ,the element of surprise was there—at least to a partial extent—and it is questionable whether other expeditions of this character will give equally favorable results; since the Germans, from now on, will presumably be at watch for further attacks. If the channels are blocked, and particularly if, as one account states, one or two dredges were sunk, it will be many days and possibly weeks before the submarines and destroyers which were sheltering in the basins and within the canal, will be available for service.—*Scientific American*, 11/5.

FULL STORY OF THE RAID.—*Twisting the Dragon's Tail.*—April 25 there was issued an official account of the great naval attack on Zeebrugge and Ostend on the morning of St. George's Day. It gives for the first time the names of the principal officers who took part in the enterprise, and announces that Vice Admiral Keyes directed the operation from the destroyer *Warwick*.

The story of the landing at the mole is told in the following words:

Vindictive was fitted along the port side with a high false deck, whence ran the 18 brows or gangways, by which the storming and demolition parties were to land. The men were gathered in readiness on the main and lower decks, while Colonel Elliot, who was to lead the marines, waited on the false deck just abaft the bridge, and Captain H. C. Halahan, who commanded the bluejackets, was amidships. The gangways were lowered, and scraped and rebounded upon the high parapet of the mole as *Vindictive* rolled; and the word for the assault had not yet been given when both leaders were killed, Colonel Elliot by a shell and Captain Halahan by the machine-gun fire which swept the decks. The same shell that killed Colonel Elliot also did fearful execution in the forward stokes mortar battery.

"The men were magnificent." Every officer bears the same testimony. The mere landing on the mole was a perilous business; it involved a passage across the crashing, splintering gangways, a drop over the parapet into the field of fire of the German machine-guns which swept its length, and a further drop of some 16 feet to the surface of the mole itself. Many were killed and more were wounded as they crowded up to the gangways; but

nothing hindered the orderly and speedy landing by every gangway. Lieutenant H. T. C. Walker had his arm carried away by a shell on the upper deck, and lay in the darkness while the storming parties trod him under. He was recognized and dragged aside by the commander. He raised his remaining arm in greeting. "Good luck to you," he called, as the rest of the stormers hastened by; "good luck!"

The lower deck was a shambles as the commander made the rounds of his ship; yet those wounded and dying raised themselves to cheer as he made his tour. The crew of the howitzer which was mounted forward had all been killed; a second crew was destroyed likewise; and even then a third crew was taking over the gun. In the stern cabin a firework expert who had never been to sea before—one of Captain Brock's employees—was steadily firing great illuminating rockets out of a scuttle to show up the lighthouse on the end of the mole to the block ships and their escort.

The *Daffodil*, after aiding to berth *Vindictive* should have proceeded to land her own men, but now Commander Carpenter ordered her to remain as she was, with her bows against *Vindictive's* quarter, pressing the latter ship into the mole. Normally, *Daffodil's* boilers develop 80 pounds pressure of steam per inch; but now, for this particular task, Artificer Engineer Sutton, in charge of them, maintained 160 pounds for the whole period that she was holding *Vindictive* to the mole. Her casualties, owing to her position during the fight, were small—one man killed and eight wounded, among them her commander, Lieutenant H. Campbell, who was struck in the right eye by a shell splinter.

Iris had troubles of her own. Her first attempts to make fast to the mole ahead of *Vindictive* failed, as her grapnels were not large enough to span the parapet. Two officers, Lieut. Commander Bradford and Lieutenant Hawkins, climbed ashore and sat astride the parapet trying to make the grapnels fast till each was killed and fell down between the ship and the wall. Commander Valentine Gibbs had both legs shot away, and died next morning. Lieutenant Spencer, R. N. R., though wounded, took command, and refused to be relieved. *Iris* was obliged at last to change her position, and fall in astern of *Vindictive*, and suffered very heavily from the fire. A single big shell plunged through the upper deck and burst below at a point where 56 marines were awaiting the order to go to the gangways. Forty-nine were killed, and the remaining seven wounded. Another shell in the ward-room, which was serving as sick-bay, killed four officers and 26 men. Her total casualties were eight officers and 69 men killed and three officers and 102 men wounded.

The storming and demolition parties upon the mole met with no resistance from the Germans other than the intense and unremitting fire. The geography of the great mole, with its railway line and its many buildings, hangars and store sheds, was already well known, and the demolition parties moved to their appointed work in perfect order. One after another the buildings burst into flame or split and crumbled as the dynamite went off. A bombing party working up towards the mole extension in search of the enemy destroyed several machine-gun emplacements, but not a single prisoner rewarded them. It appears that upon the approach of the ships, and with the opening of the fire, the enemy simply retired and contented themselves with bringing machine-guns to the shore end of the mole. And while they worked and destroyed, the covering party below the parapet could see in the harbor, by the light of the German star shells, the shapes of the block ships stealing in and out of their own smoke and making for the mouth of the canal.

Thetis came first, steaming into a tornado of shell from the great batteries ashore. All her crew, save a remnant who remained to steam her in and sink her, had already been taken off, but the remnant spared hands enough to keep her four guns going. It was hers to show the road to *Intrepid* and *Iphigenia*, who followed. She cleared the string of armed

barges which defends the channel from the tip of the mole, but had the ill-fortune to foul one of her propellers upon the net defence which flanks it on the shore side. The propeller gathered in the net and rendered her practically unmanageable; the shore batteries found her and pounded her unremittingly; she bumped into a bank, edged off and found herself in the channel again, still some hundreds of yards from the mouth of the canal, in a practically sinking condition. As she lay she signalled invaluable directions to the others, and here Commander R. S. Sneyd, D. S. O., accordingly blew the charges and sank her. A motor launch under Lieutenant H. Littleton, R. N. V. R., raced alongside and took off her crew. Her losses were five killed and five wounded.

Intrepid, smoking like a volcano and with all her guns blazing, followed; her motor launch had failed to get alongside outside the harbor, and she had men enough for anything. Straight into the canal she steered, her smoke blowing back from her into *Iphigenia's* eyes, so that the latter, blinded and going a little wild, rammed a dredger with a barge moored beside it which lay at the western arm of the canal. She got clear, though, and entered the canal pushing the barge before her. It was then that a shell hit the steam connections of her whistle, and the escape of steam which followed drove off some of the smoke and let her see what she was doing.

Lieutenant Stuart Bonham-Carter, commanding the *Intrepid*, placed the nose of his ship neatly on the mud of the western bank, ordered his crew away and blew up his ship by the switches in the chart-room. Four dull bumps was all that could be heard, and immediately afterwards there arrived on deck the engineer, who had been in the engine-room during the explosion, and reported that all was as it should be.

Lieutenant E. W. Billyard-Leake, commanding *Iphigenia*, beached her according to arrangement on the eastern side, blew her up, saw her drop nicely across the canal, and left her with her engines still going to hold her in position till she should have bedded well down on the bottom. According to the latest reports from air observation, the two old ships, with their holds full of concrete, are lying across the canal in a V position; and it is probable that the work they set out to do has been accomplished and that the canal is effectively blocked.

A motor-launch under Lieutenant P. T. Deane, R. N. V. R., had followed them in to bring away the crews, and waited farther up the canal towards the mouth against the western bank. Lieutenant Bonham-Carter, having sent away his boats, was reduced to a Carley float, an apparatus like an exaggerated lifebuoy with a floor or grating. Upon contact with the water it ignited a calcium flare, and he was adrift in the uncanny illumination with a German machine-gun a few hundred yards away giving him its undivided attention. What saved him was possibly the fact that the defunct *Intrepid* was still emitting huge clouds of smoke which it had been worth nobody's while to turn off. He managed to catch a rope as the motor-launch started, and was towed for a while till he was observed and taken on board.

Another officer jumped ashore and ran along the bank to the launch. A bullet from the machine-gun stung him as he ran, and when he arrived, charging down the bank out of the dark, he was received by a member of the launch's crew, who attacked him with a hammer.

The whole harbor was alive with small craft. As the motor-launch cleared the canal and came forth to the incessant geysers thrown up by shells, rescuers and rescued had a view of yet another phase of the attack. The shore end of the mole consists of a jetty, and here an old submarine, commanded by Lieutenant R. D. Sandford, R. N., loaded with explosives, was run in to the piles and touched off, her crew getting away in a boat to where the usual launch awaited them. Officers describe the explosion as the greatest they ever witnessed—a huge roaring spout of flame that tore the jetty in half and left a gap of over 100 feet. The claim of another launch to have sunk a torpedo-boat alongside the jetty is supported by many

observers, including officers of the *Vindictive*, who had seen her mast and funnel across the Mole and noticed them disappear.

Meantime the destroyers *North Star*, *Phœbe*, and *Warwick*, which guarded the *Vindictive* from action by enemy destroyers while she lay beside the mole, had their share in the battle. *North Star*—Lieut. Commander K. C. Helyar, R. N.—losing her way in the smoke, emerged to the light of the star shells, and was sunk. The German *communiqué* which states that only a few members of the crew could be saved by them is in this detail of an unusual accuracy; for the *Phœbe*—Lieut. Commander H. E. Gore-Langton, R. N.—came up under a heavy fire in time to rescue nearly all. Throughout the operation monitors and the siege guns in Flanders manned by the Royal Marine Artillery heavily bombarded the enemy's batteries.

The wind that blew back the smoke-screen at Zeebrugge served us even worse off Ostend, where that and nothing else prevented the success of an operation ably directed by Commodore Hubert Lynes, C. M. G. The coastal motor-boats had lit the approaches and the ends of the piers with calcium flares and made a smoke cloud which effectually hid the fact from the enemy *Sirius* and *Brilliant* were already past the stream bank buoy when the wind changed, revealing the arrangements to the enemy, who extinguished the flares with gun-fire.

The *Sirius* was already in a sinking condition, when at length the two ships, having failed to find the entrance, grounded and were forced, therefore, to sink themselves at a point about 400 yards east of the piers, and their crews were taken off by motor-launches under Lieutenant K. R. Hoare, R. N. V. R., and Lieutenant R. Bourke, R. N. V. R.

The motor-launches here were under the command of Commander Hamilton Benn, R. N. V. R., D. S. O., M. P., while those at Zeebrugge were commanded by Captain R. Collins, R. N. (the vice admiral's flag captain). All the coastal motor-boats were commanded by Lieutenant A. P. Wellman, D. S. O., R. N. The torpedo-boat destroyer flotilla was commanded by Captain Wilfred Tomkinson, R. N.

The difficulty of the operations is to be gauged from the fact that from Zeebrugge to Ostend the enemy batteries number not less than 120 heavy guns, which can concentrate on retiring ships, during daylight, up to a distance of about 16 miles.—*London Times.*

ATTACK ON ZEEBRUGGE BASE DECLARED COMPLETE SUCCESS.—The Associated Press learns from a high naval source that the operations at Zeebrugge were a complete success, with the result that the Flanders flotilla now will be obliged to resort to the Ostend route in putting to sea, from which the British forces can more easily handle the German ships.

In addition to the damage done, the mole and the German guns, material and shipping, the channel has been blocked by the cement ships and a German dredger was destroyed.

The loss of the dredger, together with the blocking up of the channel, must result in the speedy silting up of the waterway, and it will take at least several weeks to clear the passage.

Reuter's Amsterdam correspondent sends the following telegram, received from Berlin:

"The Kaiser on Tuesday visited Zeebrugge, the scene of the frustrated English raid. He boarded the mole, where he convinced himself that the damage caused by the blowing up of the railway bridge had already been temporarily repaired and that a final bridging of the gap can be done in a few days. He also satisfied himself of the perfectly good condition of all the structures and installations on the outer part of the mole, which was the objective of the attack."

To Discipline German Admiral.—Vice Admiral Schroeder, the commander at Zeebrugge, according to reports reaching here, will be deprived of his command for being taken by surprise by the British Tuesday. Ger-

man newspapers, in commenting on raid at Zeebrugge, generally, take the hint given in the official reports at Berlin and represent the enterprise as having been a failure. Some, however, admit that the attack was made with great boldness.

The *Lokal Anzeiger* says that the raiders succeeded in blocking the waterway to a great extent, but that the U-boats still are able to leave their harbor, as a narrow passage remains.—*Evening Star*, 26/4.

SAYS AMERICANS PARTICIPATED IN ZEEBRUGGE RAID.—Scouting by American aviators of both the army and navy played an important part in the British raid on the German submarine base at Zeebrugge, according to an American naval officer who arrived at an Atlantic port aboard a French steamship yesterday.—*N. Y. Herald*, 8/5.

BRITISH LOST 588 IN RAID.—The total British casualties in the operations on Tuesday against Zeebrugge and Ostend were 588, according to an official announcement to-night. These were divided as follows:

Officers.—Killed, 16; died of wounds, 3; missing, 2; wounded, 29.

Men.—Killed, 144; died of wounds, 25; missing, 14; wounded, 355.—*N. Y. Herald*, 28/4.

STORY OF SINKING OLD "VINDICTIVE" AT OSTEND.—London, May 14.—The Admiralty has issued the following graphic story of the Ostend operation:

"Dunkirk, May 11.—The *Sirius* lies in the surf some 2000 yards east of the entrance to Ostend harbor, which she failed so gallantly to block, and when in the early hours of yesterday morning the *Vindictive* groped her way through the smoke screen and headed for the entrance it was as though the old fighting ship awoke and looked on.

"A coastal motor-boat had visited her and hung a flare in her slack and rusty rigging, and that eye of unsteady fire, paling in the blaze of star shells, or reddening through the drift of smoke, watched the whole great enterprise from the moment when it hung in doubt to its ultimate triumphant success.

"The planning and execution of that success had been intrusted by Vice Admiral Sir Robert Keyes to Commodore Hubert Lynes, who directed the previous attempt to block the harbor with the *Sirius* and *Brilliant*. Upon that occasion a combination of unforeseen and unforeseeable conditions had fought against him.

"Upon this the main problem was to secure the effect of a surprise attack upon an enemy who was clearly, from his ascertained dispositions, expecting him. The *Sirius* and *Brilliant* had been baffled by the displacement of the Stroom bank buoy, which marks the channel to the harbor entrance. But since then aerial reconnaissance had established that the Germans had removed the buoy altogether and that there now were no guiding marks of any kind. They also had cut gaps in the piers as a precaution against a landing, and, further, when toward midnight Thursday the ships moved from their anchorage, it was known that some nine German destroyers were out and were at large upon the coast.

"The solution of the problem is best indicated by the chonicle of events. It was a night that promised well for the enterprise—nearly windless—and what little breeze stirred came a point or so west of north. The sky was lead blue, faintly star-dotted, with no moon, and a still sea for small craft, motor-launches and coastal motor-boats, whose work was done close inshore.

"From the destroyer which served the commodore for a flagship, the remainder of the force were visible only as silhouettes of blackness—the destroyers looming like cruisers in the darkness, the motor-boats like destroyers and the coastal motor-boats showing themselves as racing hillocks of foam.

"From Dunkirk a sudden, brief flurry of gun-fire announced that German airplanes were about. They were actually on the way to visit Calais, and over the invisible coast of Flanders the summer lightning of restless artillery rose and fell monotonously.

"'There's the *Vindictive!*' The muffled seamen and marines standing by the torpedo tubes and guns turned at that name to gaze at the great black ship, seen mistily through the screening smoke from the destroyers' funnels, plodding silently to her goal and end. Photographs had made familiar that high-sided profile, her tall funnels with Zeebrugge scars, always with the background of the pier at Dover, against which she lay to be fitted for her last task. Now was added to her the environment of night and sea and the greatness of the tragedy of her mission.

"She receded into the night astern, as a destroyer raced on to lay a light buoy that was to be her guide, and those on board saw her no more. She passed thence into the hands of the small craft whose mission was to guide her, light her and hide her in the clouds of a smoke screen.

"There was no preliminary bombardment of the harbor and batteries, as before the previous attempt. That was to be the first element in the surprise. A time table had been laid down for every stage of the operation, and the staff work beforehand even included precise orders for laying the smoke barrage, with plans calculated for every direction of the wind.

"Monitors anchored in firing positions far seaward awaited the signal. The great sea batteries of the Royal Marine Artillery in Flanders, among the largest guns that were ever placed on land mountings, stood by likewise to neutralize the big German artillery along the coast, and the airmen who were to collaborate with an aerial bombardment of the town, waited somewhere in the darkness overhead. Destroyers patrolled to seaward of the small craft.

"The *Vindictive*, always at that solemn gait of hers, found the flagship's light buoy and bore up for where a coastal motor-boat commanded by Lieutenant William R. Slayter was waiting by a calcium flare upon the old position of the Stroom bank buoy.

"Four minutes before she arrived there, and 15 minutes only before she was due at the harbor mouth, the signal for the guns to open was given. Two motor-boats under command of Lieutenant Albert L. Poland dashed in toward the ends of the high wooden piers and torpedoed them. There was a machine gun on the end of the western pier, and that vanished in a roar and leap of flames—which called to the guns.

"Over the town a flame suddenly appeared high in the air and sank slowly eastwards, the signal that the air-planes had seen and understood. Almost coincidentally with their first bombs came the first shells, whooping up from the monitors at sea. The surprise part of the attack was sprung. The surprise, despite the German's watchfulness, seems to have been complete. Up until the moment when the torpedoes of the motor-boats exploded there had not been a shot from the land—only occasional routine star shells.

"The motor-launches were doing their work magnificently. These pocket warships manned by officers and men of the Royal Naval Volunteer Reserve are specialists at smoke production. They built to either hand of the *Vindictive's* course the likeness of a dense sea mist, driving landward with the wind. Star shells paled and were lost as they sank in it; the beams of searchlights seemed to break off short upon its front. It blinded the observers in the great batteries, which suddenly, upon the warning of the explosions of guns, roared into action.

"There was a while of tremendous uproar. The coast about Ostend is ponderously equipped with batteries, each with a name known and identified as Von Tirpitz, Von Hindenberg, Deutschland, Cecilia and the rest. They register from six inches to monsters of 15-inch naval pieces in land turrets, and the Royal Marine Artillery fights a war-long duel with

them. These now opened fire into the smoke and over it at the monitors and marines, and the monitors replied.

"Meanwhile the airplanes were bombing methodically and anti-aircraft guns were searching the skies for them. Star shells spouted up and floated down, lighting the smoke banks with spreading green fires, and those strings of luminous green balls which the airmen called 'flaming onions' soared up, to lose themselves in the clouds.

"Through all this stridency and blaze of conflict the old *Vindictive*, still unhurrying, was walking the lighted waters toward the entrance. It was then that those on the destroyers became aware that what seemed to be merely smoke was wet and cold; that the rigging was beginning to drip, and that there were no longer any stars. A sea fog had come on.

"The destroyers had to turn on their lights and use their sirens to keep in touch with each other. The air attack was suspended and the *Vindictive*, with some distance yet to go, found herself in gross darkness. There were motor-boats on either side of her, escorting her to the entrance. These were supplied with what are called Dover flares, enormous lights capable of illuminating square miles of sea. At once every pistol was fired as a signal to light these, but the fog and smoke together were too dense for even the flares.

"The *Vindictive* then put her helm over and started to cruise to find the entrance. Twice she must have washed across, and at the third turn, upon reaching the position at which she first lost her way, there came a rift in the mist and she saw the entrance and the piers on either side and an opening dead ahead.

"The inevitable motor-boat, *U P 22*, commanded by Acting Lieutenant Guy L. Cockburn, raced on into the opening under heavy and momentarily growing fire and planted a flare on the water between the piers. The *Vindictive* steamed over it and on. She was in.

"The guns found her at once. She was hit every few seconds after she entered, her scarred hull broken afresh in a score of places, her decks and upper works swept by machine guns. The machine gun at the end of the western pier had been put out of action by a motor-boat's torpedo, but from other machine guns at the inshore end of the pier from a position on the front and from machine guns apparently firing over the eastern pier there converged upon her a hail of lead.

"After her control was demolished by a shell which killed all the occupants, including Sublieutenant Angus H. MacLachan, who was in command of it, the upper and lower bridges and the chart-room, swept by bullets, Commander Godsal ordered the officers to go with him in the conning-tower. They observed through the observation slit in the steel wall of the conning-tower that the eastern pier was breached some 200 yards from the seaward end as though at some time a ship had been in collision with it. They saw the front of the town silhouetted again and again in the light of the guns that blazed at them. The night was a patchwork of fire and darkness.

"Immediately after passing the breach in the pier Commander Godsal left the conning-tower and went on deck the better to watch the ship's movements. He chose a position and called in through the slit of the conning-tower his order to starboard the helm. The *Vindictive* responded and laid her battered nose to the eastern pier and prepared to swing her length across the channel.

"It was at that moment that a shell from the shore batteries struck the conning-tower. Lieutenant Sir John Alleyne and Lieutenant V. A. C. Crutchley were still within. Commander Godsal was close to the tower outside. Lieutenant Alleyne was stunned by the shock. Lieutenant Crutchley shouted through the slit to the commander, and, receiving no answer, rang for the port engine full speed astern to help the swinging ship. By this time she was lying at an angle of about 40 degrees to the pier and seemed to be hard fast, so it was impossible to bring her farther around.

"After working the engines some minutes to no effect, Lieutenant Crutchley gave the order to clear the engine room and abandon ship, according to the program previously laid down. Engineer Lieut. Commander Williarm A. Bury, who was the last to leave the engine room, blew the main charges by a switch installed aft. Lieutenant Crutchley blew the auxiliary charges in the forward 6-inch magazine from the conning-tower.

"Those on board felt the old ship spring as the explosive tore the bottom plates and bulkheads from her. She sank about six feet and lay upon the bottom of the channel. Her work was done.

"It is to be presumed that Commander Godsal was killed by the shell which struck the conning-tower. Lieutenant Crutchley, searching the ship before he left her, failed to find his body or that of Sublieutenant MacLachlan in that wilderness of splintered wood and shattered steel. In the previous attempt to block the port Commander Godsal commanded the *Brilliant*, and together with all the officers of that ship and of the *Sirius* had volunteered at once for the further operation.

"Engineer Lieut. Commander Bury, who was severely wounded, and had been in the *Vindictive* in the attack on Zeebrugge mole. He had urged upon the vice admiral his claim to remain with her and with four engine-room artificers, in view of his and their special knowledge of her engines.

"The names of these four are A. Cavanagh, H. M. S. *Vindictive*, wounded; M. Caroll, royal naval barracks, Chatham, wounded; A. Thomas, H. M. S. *Lion*, missing; H. Harris, H. M. S. *Royal Sovereign*.

"The coxswain was a first-class petty officer, J. J. Reed, royal naval barracks, Chatham, who had been with Commander Godsal in the *Brilliant*, and whose urgent request that he be allowed to remain with him had been granted. The remainder of the crew were selected from a large number of volunteers from the ships of the Dover patrol.

Most of the casualties were incurred while the ship was being abandoned. The men behaved with just that cheery discipline and courage which distinguished them in the Zeebrugge raid. Petty Officer Reed found Lieutenant Alleyne in the conning-tower still unconscious, and carried him aft under a storm of fire from machine guns. Lieutenant Alleyne was badly hit before he could be got over the side and fell into the water. Here he managed to catch hold of a boat, and a motor-launch under Lieutenant Bourke succeeded in rescuing him and two other wounded men.

"The remainder of the crew were taken off by a motor-launch under Lieutenant Geoffrey H. Drummond under a fierce fire. When finally he reached the *Warwick* the launch was practically in a sinking condition; her bows were shot to pieces. Lieutenan Drummond himself was severely wounded. His second in command, Lieutenant Gordon Ross, and one hand were killed. A number of others were wounded. The launch was found too damaged to tow. Day was breaking and she and the *Warwick* were in easy range of the forts. As soon as her crew and the *Vindictive* survivors were transferred a demolition charge was placed in her engine room and she was sunk.

"All was according to program. Recall rockets for the small craft were fired from the flagship at 2.30 a. m. Great red rockets whizzed up, to lose themselves in the fog. They could not have been visible half a mile away, but the work was done and one by one the launches and motor-boats commenced to appear from the fog and stopped their engines alongside. The destroyers exchanged news with them. There were wounded men to be transferred and dead men to be reported. But no one had seen a single enemy craft. Nine German destroyers which were out, free to fight, had chosen the discreeter part.

"Vice Admiral Sir Roger Keyes was present at the operation on the destroyer *Warwick*. Commander Hamilton Benn, N. V P., D. S. O., M. P., was in command of the motor-launches, and Lieutenant Francis

C. Harrison, R. N., D. S. O., was in charge of the coastal motor-boats. The central smoke screen was intrusted to Sublieutenant Humphrey V. Low and Sublieutenant Leslie R. Blake. The casualties, as at present reported, stand at two officers and six men killed; two officers and ten men, all of the *Vindictive*, missing and believed killed and four officers and eight men wounded.

"It is not claimed by the officers who carried out the operations that Ostend harbor is completely blocked. But its purpose to embarrass the enemy and make the harbor impracticable to any but small craft and for dredging operations difficult has been fully accomplished. The position of the *Vindictive* is with stem on to the eastern pier, and not her stern, as shown in certain published illustrations."—*Washington Evening Star*, 14/5.

BRITISH SUBMARINES HAVE TORPEDOED 40 HUN WARSHIPS.—*Two German Dreadnoughts Included in Official Review Received Here.*—More than 40 German warships have been attacked successfully by British submarines.

This was disclosed by an official British statement received her and made public to-day by the Committee on Public Information. The review was the most extensive ever received in this country of the work of the British under-water craft, concerning the activities of which little news has reached America since their famous raids in the Dardanelles and the Baltic Sea.

Most of the battles narrated in the review were with German destroyers which had sallied forth, presumably on raiding expeditions, but in one instance a submarine commander told of sighting four dreadnoughts of the *Kaiser* class off the Dutch coast and of discharging torpedoes at two of them. The submarine submerged as the torpedoes were fired, but from the sounds of explosions which the commander heard he concluded that two of the battleships were hit. The submarine was prevented by German destroyers from rising to the surface to observe the effects of its attack.—*N. Y. Herald*, 9/5.

GREAT MINE-FIELD IN NORTH SEA.—According to Archibald Hurd, in the London *Daily Telegraph*, the area in the North Sea, recently announced by the British Government as prohibited, as dangerous to shipping after May 15, will be the greatest mine-field ever laid for the special purpose of foiling submarines. It will embrace 121,782 square miles, the base forming a line between Norway and Scotland and the peak extending northward into the Arctic Circle.

Archibald Hurd, who is an authority on naval subjects, says that there has been a vast improvement in British mines since Admiral Jellicoe became First Sea Lord. Hurd points out that the creating of this barrier across the northern exit of the North Sea was an enormous task, involving 12 or more months, and estimates that tens of thousands of mines were required to cover the area. He suggests that when Admiral Jellicoe made his famous prophecy that the submarine menace would be met by August, that he had this mine-field in mind.—*Nautical Gazette*, 11/5.

GERMAN NAVAL ACTIVITIES.—No German war vessel larger than a destroyer has shown itself 150 miles west of Heligoland from August, 1916, to October, 1917, when two light cruisers attacked the Scandinavian convoy." That statement continues to present a picture of the state of affairs in the North Sea, although how soon it may be varied no one can attempt to predict. In spite of the strength of the High Seas Fleet, it is seldom indeed that any attempt is made to show the German flag in what was once called the "German Ocean," whereas at all times the British Fleet not only controls the communications in those waters, but sweeps them from end to end and right up to the enemy's mine-fields and the approaches to his fort-defended waters.—*Army and Navy Gazette*, 20/4.

U-BOAT AND MINE SINK SLOOP AND TRAWLER.—*Fifteen British Crew Men Missing. Eight Swedes Are Killed.*—London, May 12.—The Admiralty announces that a British mine-sweeping sloop was torpedoed and sunk by a German submarine, May 6. Two officers and 13 men are missing and are presumed to have been drowned.

A dispatch to the *Exchange Telegraph* from Copenhagen says the German mine-field north of Gothenburg has brought disaster to the large Swedish trawler *Agnes*, which struck a mine betweeen Vingaa and Scalv. The trawler sank immediately. Eight Swedes on board were killed. Only two of the ship's company were saved.—*Evening Star*, 13/5.

SUBMARINES SUNK.—*Work of the R. N. A. S.—Attacks By Seaplanes.*—Instances of the successful work of the Royal Naval Air Service wherever our naval and military forces are operating were given in *The Times* of Saturday, and it is now possible to record some of the splendid services which this branch of our navy has rendered to the Empire by destroying enemy submarines.

While on patrol in the Channel, seaplane *X* sighted a submarine eight miles away, in the line of convoy which was about 10 miles off. When the seaplane reached bombing position, the top of the conning-tower was just awash, and both periscopes were out of the water. Two large bombs were released, the first of which exploded on the conning-tower, and the periscopes were seen to collapse. The second bomb hit the water 30 feet ahead of the conning-tower, in a direct line with the bow of the submarine. The seaplane then turned, and a considerable disturbance was seen on the surface—an upheaval of water, with quantities of air rushing up. Two other bombs were dropped from a height of 1000 feet, one of which exploded in the midst of the disturbance.

A Shoal of U-boats

One of our large seaplanes the other morning sighted an enemy submarine, painted light grey, with a mast and a gun on what appeared to be a raised deck. By the gun was one of the crew. Flying over the submarine, a bomb was dropped by the seaplane, and a hit was made on the tail of the vessel. Turning to repeat the attack, our airmen saw that the explosion had made a large rent in the deck, and this was photographed. At this moment gun flashes were seen some distance in front of the submarine, and through the mist came three more enemy submarines heading for the attacked vessel, escorted by three destroyers. All six vessels opened fire on our machine, but none of their shells was effective. Our seaplane again passed over the U-boat which was sinking by the stern, with the bow fully out of the water. A second bomb was released and exploded about 15 feet ahead of the bow of the submarine, causing her to sink immediately, leaving a quantity of blackish oil, air bubbles, and foreign matter on the surface. Our seaplane, having no further bombs, sent a wireless message explaining the position of the destroyers, and returned home in safety.

Two large seaplanes sighted an enemy submarine travelling about 14 knots. The first machine to reach her dropped a bomb, which exploded, and the submarine began to sink stern first, the bow rising high in the water. The second machine dropped a bomb which exploded immediately in front of the conning-tower. Another explosion occurred under water, followed by several smaller explosions. Two men were on the conning-tower as the vessel sank, but nothing more was seen of them.

Turned Turtle

Again, a seaplane and two aeroplanes on patrol saw a U-boat of very large type, with two periscopes. The submarine dived on hearing the aircraft's engines, but not before the seaplane had dropped two bombs, which fell just abaft the conning-tower, one seeming to be a direct hit. The

submarine turned upside down, and a large bubble, with wreckage, and large quantities of oil, subsequently appeared.

A patrolling airship noticed an attack by a submarine on a steamer, and flew down to the spot. By this time the submarine had submerged. Two bombs were dropped from the airship on the submerged vessel, and several bubbles, one of huge size, came to the surface. Two trawlers dropped depth charges, three of which exploded right over the target, and much oil came up.

A seaplane met a merchant ship and saw a large disturbance on the water 200 yards from the vessel. Then the wake of the torpedo was seen, but the torpedo missed the ship by a few yards. The seaplane, in less than a minute after sighting the U-boat's movements, dropped two bombs, which exploded within eight yards of each other. Large quantities of oil and bubbles rose to the surface; the merchantman proceeded on her course in safety.

An enemy submarine was sighted by two large seaplanes while on patrol. A bomb dropped by one of the seaplanes exploded just abaft the center of the submarine, which listed heavily to port, and went down by the stern within a minute.—*London Times*, 8/4.

BALTIC

GERMAN WARSHIPS ASSEMBLE AT KIEL.—The entire German Baltic fleet, except a few light cruisers, was recalled last week to Kiel, where important naval forces now are being concentrated, says a dispatch from Hamburg received in Geneva and transmitted by the correspondent of the *Daily Express*.—*N. Y. Herald*, 17/5.

BALTIC FLEET SAILS.—Petrograd, April 6.—The Russian warships have left Helsingfors for Kronstadt.

The Soviet Government has decided that the German landing concerns Finland only, and that the Soviet cannot interfere.

The newspapers state that the British Consul at Helsingfors has left for Petrograd.—*Reuter*.

Vasa, April 6.—It is announced that the "Red Guards" at Tammerfors have capitulated.—*Reuter*.

BRITISH SUBMARINES BLOWN UP BY CREWS AT HELSINGFORS.—All British submarines in the harbor of Helsingfors were destroyed when the German naval forces approached the city because it was impossible to get them away, owing to the fact that they were frozen fast, according to an Admiralty statement this evening. The submarines, which have been operating in the Baltic since the early part of the war, were blown up, together with their stocks of torpedoes, ammunition and other materials. Their crews have arrived in England, having traveled by way of Mourmansk.

The seven British submarines were destroyed during the five days from April 3 to April 8. The Admiralty says the project of blocking the harbor by sinking ships in it had been rejected by the Russian admiral commanding in chief.

The effect of the destruction of the British submarines upon the crews of merchant vessels was, however, the statement says, excellent and induced the destruction of many ships which would have fallen into the hands of the enemy.

"The guns at and near Hango," the Admiralty announcement says, "had already been dismantled, and upon the appearance of the German forces the Russians retreated from the vicinity after blowing up their four American submarines.

"Four British submarines of class E were taken outside the harbor of Helsingfors on April 3 and blown up and sunk. Three C-boats were demolished between that day and April 8. Their crews were removed to Petrograd.—*Evening Star*, 17/5.

RUSSIA'S FLEET IN THE BALTIC.—Within easy reach of the Hun lies the naval strength of Russia, a considerable force in ships of excellent design and modern construction which have been rendered completely defenceless by the demoralization of the personnel of the Russian Navy. The Germans have but to advance with land and naval forces from Reval and Helsingfors to Kronstadt and Petrograd to add to their navy four modern dreadnoughts, completed by the Russians since the outbreak of war, 30 modern destroyers of 34 knots speed and 10 modern submarines which were built in the United States and delivered to Russia since the outbreak of war. This is only the cream of the Russian naval strength, however, for Russia has in the Baltic something more than 100 destroyers of which, besides the 30 mentioned above, 20 are but about six years old; probably 15 submarines of 600 tons each in addition to her American built boats, and a number of cruisers, transports and smaller vessels of substantial value as a raiding force to an enemy who can gamble with them recklessly as can Germany.

Only the Ice Has Kept the Hun Away.—As late as the middle of April—the time of writing this article—press despatches told of the continued advance of German land forces on Russian soil. The Germans have not, however, advanced upon Petrograd nor have they attempted to steal the Russian warships and naval supplies at Kronstadt and Pootilof. Little has been said of the likelihood of their doing so. Yet it appears that the only thing that has held off the Hun from this theft is the ice that prevents the advance of his naval forces to Kronstadt. Certainly the Bolsheviki are powerless to prevent the theft. The one hope that remains to save these ships from the Hun is their destruction by Russians who are still determined not to give in to the enemy. The strong land fortifications that formerly barred the way to Kronstadt are now all in German hands and when the ice breaks the Germans have but to push forward to Kronstadt to take their spoil.

Will Their Crews Surrender Them?—It is possible that there are still Russians in the crews on board those warships who will blow up their ships rather than see them fall into the hands of the enemy. But this is only a possibility. If German propaganda has been as effective in Kronstadt as it has elsewhere in Russia it is probable, to say the least, that Germany will obtain possession of the Russian Baltic naval forces without difficulty.

Naval officers who were with the Baltic fleet as late as last November state that the four new Russian dreadnoughts are in good shape. They are new vessels and, although they have not been kept in repair, they have had practically no work and the Germans could easily and quickly put them in shape for action. The dreadnoughts are of 23,500 tons, mounting twelve 12-inch guns. They were laid down in 1909 as the first step toward the rehabilitation of the Russian Navy after the Russo-Japanese War and their guns were placed on board late in 1914.

While a gain of four dreadnoughts by Germany would not shift the preponderance of naval power in capital ships in favor of Germany against Great Britain, it must be borne in mind that the Germans are now staking everything on offensive operations and may reasonably be expected to risk a major naval engagement with the British fleet in a far more determined and genuine attack than they made at Jutland. Thus every capital ship added to the German forces must be considered as reducing the chances—for victory is never a certainty—of the British fleet to win. None of the belligerents have made public any information with regard to increases in naval strength since the outbreak of war. It is impossible, therefore, to state positively what is the German or British strength in capital ships. There have been many tales circulated of fabulous increases in German naval strength but, obviously, Germany has been devoting her resources largely to the construction of submarines. Likewise, Great Britain has been burdened with the construction of

merchant tonnage and with smaller types of warships to be used against German raiders. It is generally considered safe to presume that both Great Britain and Germany have completed, by now, all the dreadnoughts that were building at the outbreak of the war.

Making allowance for the British losses of two dreadnoughts, three battle cruisers and ten pre-dreadnoughts, and for the German losses of one battle cruiser and one pre-dreadnought, the British superiority in capital ship strength, on that basis, would now be about 16 dreadnoughts, three pre-dreadnoughts and one battle cruiser.

Thus the Russian Baltic strength, in dreadnoughts, represents about 25 per cent of the British superiority in that type of ship, and to have even a very safe margin reduced 25 per cent is a development of which serious notice must be taken.

But a possibly more serious development than that is the German gain in raiding strength—in destroyers and submarines. The Russian destroyer strength was always over-developed. It was far greater than our own destroyer strength at the outbreak of the war. The Germans are both under the necessity of employing raiding tactics and are in an excellent strategic position to do so, as we might as well frankly admit. To add a force of 30 modern 34-knot destroyers to the German Navy, plus the secondary Russian force of 20 six-year-old destroyers and 50 vessels of that type of older construction, gives the Germans an increased raiding strength which is indeed a serious matter for our allies and for ourselves. It is a force which the Germans can spend in any reckless venture to wear down the British naval strength and they may be counted upon to gamble with it if they are determined to seek a final issue on the seas.

Not only does Germany gain the Baltic submarine fleet, if she takes Kronstadt, but she obtains as well shipyards in which are facilities for the construction of 12 submarines. The Russians laid down 12 submarines every two years in the Baltic, but that was only the Russian peace time rate of construction and the Germans, with men and materials available, could of course turn them out with much greater speed. Fortunately, Russian raw materials would not be available for the Germans. Most of the raw materials for ship construction in Russia would have to be obtained from the territory that is controlled by General Kaledines and the Cossacks. The Germans could, however, ship raw materials by water from German Baltic ports to Petrograd. It is difficult to determine just what Germany would gain in the way of shipyard and ordnance construction facilities. It is said by Russian officers that there are large supplies of ammunition in stock which the Germans could take over. Shells for the dreadnoughts were provided, they say, which were never used. At Pootilof there is a naval gun factory which would fall into German hands at once.

Clearly this is a chance for gain in naval strength which it would be worth while for Germany to play for and to fight for. But she will not have to fight to get it. It is like a ripe fruit ready to drop into her lap. We have made much of the contribution our navy has made to the allied naval strength in the war zone. Unquestionably the work of the American ships has been excellent. Especially in destroyers—in the character of our ships and in the efficiency of their crews—the contribution of the American Navy to the allied forces is something of which every American can be proud. But we are concerned here only with the matter of the total strength in ships, and the fact is that the Russian naval strength which lies within such easy reach of the Hun is greater than the total strength of the 150 American warships of all types which the Secretary of the Navy has recently informed us are now with the allied forces on the other side.

Clearly the one inference allowed us is that the United States must increase its naval strength in the war zone to overcome any increase in

strength which Germany may score by taking over the Russian fleet. If there was a necessity, in the first instance, for sending these American warships into the war zone in order to increase allied strength, there is now an equal necessity to send enough more American vessels to keep the margin of superiority in naval strength where it is after the Germans take over the Russian ships.—*Sea Power,* May.

MEDITERRANEAN

A German submarine bombarded Kastelorizo, Island of Rhodes, off the coast of Asia Minor.—*Army and Navy Gazette,* 20/4.

DROVE OFF ENEMY U-BOAT.—Secretary Daniels has commended Elmer Dinnes Arnold, seaman, second class, United States Navy, armed guard detail, navy yard, New York, for the efficiency of the gun crew under his command on board the steamship *Chincha* when that vessel was attacked by a German submarine. This was the second time the *Chincha* had been attacked by a German submarine. After Arnold's gun crew had fired eight shots the submarine submerged.

Arnold enlisted at Indianapolis, Ind., September 8, 1915. Next of kin, Lillian Evans, sister, Carmel, Ind.—*Official Bulletin,* 13/5.

TEN DIE WHEN TORPEDO HITS FRENCH STEAMER.—Paris, May 17.—Ten passengers, one European and nine Arabs, were killed when the French steamer *Atlantique* was torpedoed in the Mediterranean early this month. The steamship managed to reach a port by her own means, it is announced. She measures 6447 tons.—*Evening Star,* 17/5.

BRIDGE OVER SUEZ IS NOW COMPLETED.—Cairo, Egypt, Thursday.—The swinging bridge over the Suez Canal at El Kantara, about 35 miles south of Port Said, has been completed. The bridge affords direct railway communication between Cairo and cities in Palestine.—*N. Y. Herald,* 17/5.

ADRIATIC

ALLIED POWER IN THE ADRIATIC.—"In the face of the preponderance in heavy ships which the Allies have at their disposal in or near the Adriatic," says the London *Engineer* in an article in its issue of March 22 on the Italian battle fleet, "it was scarcely to be expected that the Austro-Hungarian fleet would choose to accept a pitched battle. Instead, their tactics have been confined almost entirely to raids by light forces against the unprotected Italian coast and the Allies' lines of communication in the Lower Adriatic. Against such tactics heavy armored ships are of no avail. The vessels of the greatest value in these circumstances are light cruisers and destroyers, and unfortunately the Italian Navy was inadequately supplied with vessels of both types. A number of modern destroyers and old torpedo gunboats have been fitted up as mine-layers, a branch of naval work in which the Italians have proved themselves remarkably efficient. The submarine flotilla includes about 30 boats, coastal and sea-going, the majority of which are of the well-known *Fiat-Laurenti* type, which has been adopted in many foreign navies. Britsh and French officers who have served in the Adriatic theater have returned with the most favorable impressions of the quality of Italian naval material. The design of every ship is obviously the result of a careful study of contemporary principles in strategy and tactics, and betrays a certain independence of view not commonly met with in foreign naval circles."—*Army and Navy Journal,* 30/4.

BRITISH WON SEA FIGHT IN ADRIATIC WITH SLIGHT LOSS.—In the engagement of allied and Austrian light sea forces in the Adriatic on

April 22 the British lost seven men killed and 19 wounded, the Admiralty reports. Two British destroyers, which for a time fought five Austrian destroyers, were damaged only slightly. (The official Austrian account of the engagement issued yesterday, said one British destroyer was damaged seriously.) The announcement follows:

"On April 22 five Austrian destroyers were encountered and engaged by two of our destroyers in the Adriatic. The enemy fled for shelter to the fortified port of Durazzo, pursued by our destroyers, which had been reinforced by five more British and one French destroyer. The chase continued until after midnight when touch with the enemy was lost.

"Our two destroyers, which engaged this very superior enemy force, received only minor damages. Our total casualties were seven killed and 19 wounded. It is not known what damage was sustained by the enemy.

"On the following day Durazzo was attacked by British air forces. The only man-of-war in the harbor was one gunboat. Our machines attacked the seaplane base, dropping nearly a ton of bombs, with apparently successful results. All our machines returned safely to their base."—*N. Y. Herald*, 28/4.

ITALIANS TORPEDO AUSTRIAN WARSHIP IN RAID ON POLA.—An Austrian battleship was torpedoed by Italian naval forces in Pola Harbor early Tuesday morning, it was officially announced to-day. The battleship was of the *Viribus Unitis* type.

The Italian force worked its way into the Austrian naval base by dodging the patrol boats and searchlights of the defenders.

While the naval operation was progressing an Italian seaplane force engaged Austrian battleplanes above Pola. Two of the Austrians were brought down and several others were compelled to descend out of control. The Italian machines all returned safely.

The text of the official announcement reads:

"Italian naval units, avoiding patrol boats and searchlights, succeeded in entering Pola Harbor early on Tuesday and in torpedoing an Austrian battleship of the *Viribus Unitis* type.

"Simultaneously Italian seaplane squadrons attacked Austrian battleplanes over Pola, brought down two and forced several others down out of control. The Italian machines all returned safely to their bases."

[There are four Austrian battleships of the *Viribus Unitis* class, which comprised the largest and most modern fighting vessels completed for the Austrian Navy up to the time the European war began. The other ships of the class are the *Tegetthof*, the *Prinz Eugen* and the *Szent Istvan*. The nameship was completed in October, 1912, and the others at intervals between then and the beginning of the war, with the exception of the *Szent Istvan*, which was not finished until 1915. Each battleship of the class displaces 20,000 tons, is 525 feet long over all, 89 feet beam and 28 feet draught. Their armament comprises twelve 12-inch and twelve 5.9-inch guns in the main battery, with eighteen 11-pounders and various smaller guns, and from two to six torpedo tubes. The complement of the battleships ranges from 962 to 988 men. All are heavily armored and are classed as dreadnoughts. The *Viribus Unitis* developed a speed of 20.9 knots on her trial trip.]—*N. Y. Herald*, 17/5.

ITALIAN WARSHIPS IN RAID AT DURAZZO SINK TWO VESSELS.—*Enemy Torpedo-Boat and Steamer Sent Down.—Airplanes Bomb Military Works.* —Rome, May 17.—Italian naval forces torpedoed and sank an enemy torpedo-boat and steamer at Durazzo, on the eastern coast of the Adriatic Sunday night, it was officially announced to-day.

Italian airplanes bombed and set fire to military works in Lisza and Durazzo Tuesday.

Lisza is on the island of that name north of Durazzo.—*Baltimore Evening Sun*, 17/5.

BLACK SEA

RUSSIA'S BLACK SEA FLEET.—The latest direct information available comes from naval officers who were with the Russian fleet in the Black Sea in October, 1917. At that time there were two dreadnoughts in the Black Sea fleet. These ships were completed since the outbreak of war and are in every way first-class ships and of excellent design. Three of them were built but one, the *Imperatriza Maria*, was sunk. The *Alexandra III* and the *Ekaterina II* which remain are ships of 22,500 tons, each mounting ten 12-inch guns. More attention should be paid to the older battleships and cruisers in the Black Sea fleet than we gave that type of vessel in the Baltic fleet because the ships of enemy navies against which the Black Sea fleet, in German hands, and the Turkish fleet would be matched would have more vessels of older types. The Black Sea fleet includes the *Ievstafi*, *Pantelimon* and *Ioam Zlatoust*, ships completed in 1906, of 12,800 tons and each with armament of four 12-inch guns and four 8-inch. There is also an old type battleship of 9000 tons, built in 1896, carrying four 10-inch guns and the *Tri Sviatitelia*, built in 1893 and carrying four 12-inch guns. Two protected cruisers, the *Kagoul* and the *Pamiat Merkooria*, are of 1903 vintage and carry twelve 6-inch guns. They are both 6700-ton vessels. Although the lists of 1914 give only nine new destroyers to the Black Sea fleet, I am informed that there are 14 such vessels at Sebastopol, all 33-knot ships. There are also four 600-ton, nine 350-ton and four 250-ton destroyers, all of about 25 knots speed. Nine new submarines were built for the Black Sea fleet since the outbreak of war and there are 13 old submarines, about 10 years old.

Turkey's Contribution.—If the Germans obtain possession of the Black Sea fleet they would, of course, combine it with the Turkish fleet and with the *Goeben* and the *Breslau*, the German cruisers now in Turkish waters. The *Goeben* was beached and injured. She was reported destroyed by the British but the Germans claimed to have floated her again and to have made her ready for action. She is a battle cruiser of 23,000 tons carrying 10 modern 50-caliber 11-inch guns, and of high speed.

To this fleet Turkey could contribute two dreadnoughts built in 1913, the *Sultan Osman I* and the *Sultan Mehmet Rechad V*, the former a 23,000-ton vessel with ten 13.5-inch guns and the latter a 27,500-ton ship carrying fourteen 12-inch guns. The Turks have two old battleships built in 1891 and a protected cruiser built in 1903 as well as a miscellaneous assortment of old cruisers and gunboats, not worth much. They have very little to offer in the way of destroyers.

But the total would make a considerable naval strength with five excellent capital ships as the backbone of the fleet. The Italian and French naval forces in the Mediterranean must keep the Austrians bottled up. The existence of such a German naval force in the Levant would threaten Greece, if it did no more, and would cost the Allies a considerable naval strength to guard against this danger. It is the necessity that the Allies face to protect so many miles of coast in such widely separated zone that makes their naval problem difficult. The Germans can concentrate and select the moment when they wish to strike, remaining safely protected by land fortifications meanwhile. But the Allies must be ever on the alert, watching two exits in the North Sea to guard against the approach of the German High Seas fleet; keeping the Austrian naval forces bottled within the Adriatic, the Turko-German forces within the Dardanelles and battling with the submarine all the time. Thus the creation of any hostile naval force that constitutes a continuing menace makes their problem more difficult and requires them to employ sufficient strength in ships and men to negative that force. If the enemy's strength in the Levant is increased, a further strain is placed upon allied forces in the Mediterranean and in turn upon their forces in the North Sea.

The American Navy is the only untouched reserve from which they can draw new strength to meet such a menace.

It would be more difficult—much more difficult—for the Germans to gain possession of the Russian Black Sea fleet. That fleet is now at Sevastopol and the Germans have no naval force with which to take it. Moreover, the morale of the Russians in the Black Sea fleet is somewhat better than in the Baltic and it is believed there would be a defence of that fleet. But it is a possibility—and I do not say that it is not a probability—that the Germans will capture the Black Sea fleet likewise. And so long as it is a probability or a possibility, we should now—not when it happens—take any necessary steps to guard against danger.—*Sea Power*, May.

BLACK SEA FLEET IN PERIL, RUSSIANS HEAR.—Mr. Tchitcherin, Bolshevik Foreign Minister, has asked Germany, according to the official news agency, to give a guarantee that the Russian Black Sea fleet, while remaining at Sebastopol, will not be seized or damaged by forces of the Central Powers and their allies now advancing into the Crimea, nor by any other naval or military forces of that alliance.

The Foreign Minister has taken this action, it is added, as he has heard that the Germans intend to blockade Sebastopol with submarines.—*N. Y. Herald*, 26/4.

PACIFIC

FIFTY-EIGHT IN "SEEADLER" CREW INTERNED IN CHILE.—Fifty-eight of the crew of the German raider *Seeadler*, which operated in the South Pacific Ocean until it was wrecked, have been interned in Chile, according to an announcement to-day by naval authorities here.

The *Seeadler* sank a number of American vessels and was wrecked on an island in the Pacific. The crew was transferred to a captured vessel and continued their raids on commerce until they were captured.—*N. Y. Herald*, 20/4.

INTERNED SHIP BURNED.—*Prinz Eitel Friedrich Sinks at Anchor in Colombian Harbor.*—The German steamer *Prinz Eitel Friedrich*, which has been interned at Puerto Colombia, was burned and sunk at her anchorage there to-day.

The steamer was owned by the Hamburg-American Line and displaced 4650 tons.—*Baltimore Sun*, 28/4.

U-BOATS

TEN SUBMARINES SUNK BY AVIATORS.—Details concerning the destruction recently of ten German submarines by naval aircraft, eight by seaplanes and the others by dirigibles, have been obtained by the Associated Press from British Admiralty reports. The first case is described as follows:

"While on patrol in the English Channel a seaplane sighted a submarine eight miles away, directly in the path of an oncoming convoy of merchant ships. The seaplane dived at 90 miles an hour. The submarine attempted to escape by submerging, but was just awash as the seaplane reached a bombing position and released two bombs, one of which exploded on the conning-tower. The seaplane dropped two more bombs into the midst of the air bubbles from the collapsed submarine, which was of the largest type, carrying two guns."

The second case: "At dawn a seaplane sighted a large submarine on the surface, with a member of the crew standing by the gun. The seaplane dropped a bomb on the tail of the U-boat and afterward photographed the

sinking submarine, with a big hole in its deck. A second bomb was dropped close to the submarine's bow and the U-boat collapsed."

The third case: "Two seaplanes attacked a large submarine traveling on the surface at 14 knots, with two men in the conning-tower. A bomb was exploded close to the conning-tower, and the submarine began to sink stern first. A bomb from a second seaplane completed the work."

The fourth case: "Three patrol planes sighted a large submarine as it was submerging and dropped two bombs close to the conning-tower, causing the submarine to turn turtle and disappear in a mass of oil and wreckage."

The fifth case: "A seaplane sighted two submarines close to the surface and dropped two bombs. One bomb was ineffective, but the other hit the deck fairly amidships. The submarine was hidden by the smoke of the explosion, and when the smoke cleared the U-boat was sinking, with both ends in the air."

The sixth case: "A seaplane saw the track of a torpedo fired at a merchantman. It dived toward the shadow of the submarine, well below the surface. It dropped two bombs, which both exploded close to the submarine, resulting in a large quantity of oil, bubbles and wreckage."

The seventh case: "Two seaplanes sighted a U-boat on the surface and dropped a bomb each. The first bomb caused a heavy list to the U-boat, which began to sink by the stern. The second bomb exploded in the center of the swirl, demolishing the U-boat."

The eighth case: "A seaplane dropped a bomb on a submarine just emerging, and the U-boat disappeared with a heavy list to port. The pilot dropped a second bomb into the swirl, and a few minutes later a patch of oil 150 feet long and 12 feet wide appeared on the surface."

The ninth case: "A naval airship at midday sighted a suspicious patch of oil and circled it in an effort to ascertain the cause. Suddenly a periscope broke the surface in the midst of the oil. The airship dropped a bomb close to the periscope, and a series of bubbles began appearing, indicating that the damaged submarine was moving slowly away under the water. Several more bombs were dropped in the path indicated, until satisfactory evidence was obtained of the enemy's destruction."

The tenth case: "An airship dropped two bombs over a submarine which was engaged in attacking merchantmen. Great patches of oil and bubbles indicated severe damage, and trawlers made this complete by depth discharges."—*Flying*, May.

TORPEDOED U-BOATS.—Permission has been given by the British Admiralty to publish from its records the following details of further typical encounters with U-boats:

Motor launches were out on patrol when one of them detected a submarine under water. This was confirmed shortly afterwards by the two other boats, and appearances indicated that the submarine was zig-zagging. The hunters took up the chase, and it became obvious that the submarine realized she was being pursued and was stopping every time the launches stopped. So the game of blind man's buff went on till at last the launches had maneuvered into the desired position. Then they "laid their eggs." There were some under-water explosions, and a quantity of oil spread itself over the surface of the sea.

A submarine has been reported in a particular area, and it was pretty certain that she was lying on the bottom. The German would have to come to the surface to charge batteries, but as this proceeding would be highly dangerous for him in daylight, it was much more likely that he would attempt the operation by night. Accordingly a number of vessels were detailed to watch for him during the night in question. Luck was with the flotilla; the sea was very smooth, the night dark but clear, and the vessels engaged took up their appointed stations for the hunt. Between 1 and 2 a. m., one of the vessels "got a clue," and at once proceeded to the spot so as to be ready to welcome the U-boat directly he came to the sur-

face. Presently the German was sighted and fire was opened on him. He hastened to submerge, helped by a depth charge, after which nothing was heard of him.

A destroyer was escorting a convoy of merchantmen when she sighted the periscope of a submarine before the beam of the convoy and about half a mile away. The destroyer made haste to close, while the enemy quickly dived. A depth charge was dropped into the swirl caused by the German's disappearance, and the under-water explosion drove wreckage and portions of the submarine up to the surface. Just then another periscope was sighted, and a round was fired in its direction. This submarine fired a torpedo at the destroyer, but missed her and then submerged. Another destroyer engaged in escort duty sighted a periscope about two miles distant, and headed for the position. A depth charge was dropped in what was guessed to be the enemy's course, the German having dived, but with no apparent result. The destroyer continued her work, and at the end of an hour there came a dull and heavy under-water explosion. Then quantities of oil rose to the surface; but nothing more of the submarine was seen.

In the following terms the captain of one of our submarines described in his report how he sank an enemy vessel:

10 a. m.—Sighted hostile submarine; attacked same.

10.03 a. m.—Torpedoed submarine, hit with one torpedo amidships. Submarine seen to blow up and disappear. Surface to look for survivors. Put down immediately by destroyers, who fired at me.

By way of a note he adds: "During my attack there was just enough sea to make depth-keeping difficult. I fired two torpedoes, and one hit at forward end of conning-tower. A large column of yellow smoke, about one and a half times as high as the mast, was observed, and the submarine disappeared. The explosion was heard and felt in our own submarine. I proceeded four miles northward, and lay on the bottom. Many vessels throughout the day were heard in proximity. Several explosions were heard, especially one very heavy one. It must have been close, as the noise was considerably louder than that of the torpedo. On one occasion a wire-sweep scraped the whole length of the boat along my port side, and a vessel was heard to pass directly overhead."

After a chase lasting nearly two hours one of our submarines succeeded in sinking her quarry, an enemy submarine. The hostile vessel had evidently just come to the surface, as men were noticed on her bridge spreading the bridge screen. While maneuvering to attack, our submarine had to pass through shallow water, and as the sea was rough at the time, she frequently bumped the bottom heavily, but, fortunately, avoided breaking surface.

At a range of 550 yards both bow tubes were fired. On firing the periscope was dipped in case the boat rose, and the tube was brought to bear so as to be ready in the event of a miss with both tubes. Fifteen or twenty seconds after firing a dull report was heard.

On the periscope being raised, after a short interval, nothing was seen of the enemy submarine, but there was a great disturbance in the water where she had been. On proceeding to the spot where she was last seen, it was observed that the water was covered with an oily substance, which stuck to the glass of the periscope, obscuring vision. Although the vessel was not actually seen to sink there is little doubt that she was torpedoed, as it is improbable that she could have dived while steaming on the surface in the brief space during which the British submarine's periscope was lowered.—*Army and Navy Register*, 27/4.

JUST WHAT THE U-BOATS ARE DOING.—The failure of the German submarine to prevent the landing of American forces in France and food for the Allies is given by some observers as the real cause of the Hindenburg drive on the western front. It is generally conceded, remarks a writer

in the New York *Sun*, that the German Government timed the drive in the hope of getting a decision before the United States was able to throw its weight into the military scales on the side of the Entente. This is an admission that the U-boat campaign can no longer be relied upon to stop the flow of troops, provisions, and supplies from this country to Europe. As a further indication of the diminishing efficacy of the submarine, we have the low record of sinkings in the week ending April 7, when the U-boats' toll was four large and two small vessels. To say that the submarine menace has been brought fully under control would be foolish, remarks the Atlanta *Journal*, which thinks it will probably remain more or less of a menace to the end of the war. However, there is assurance in the fact that the stroke on which the Huns counted a year ago to win has been "broken to such an extent that they themselves now recognize how indecisive it is." A corroborating German opinion is found in the Berlin *Lokal Anzeiger*, whose navy expert, Captain Kühlwetter puts this question: "How is it that despite our submarines' work we hardly ever sink an American troop-transport, or when we do sink one we always find that only the ship is lost, whereas the troops whom we really want to destroy are always saved?" To his own question, Captain Kühlwetter gives this reply:

"American transports travel in convoys, well protected against attack, and are very fast. Thus the submarines have a most difficult and dangerous task. This is particularly true in the Channel, where the enemy can choose the most favorable hours of the day and can protect himself by all sorts of devices, mines, nets, etc.

"To try to seize the bull by the horns here would mean attacking a powerful enemy front, which can be broken more cheaply in other ways.

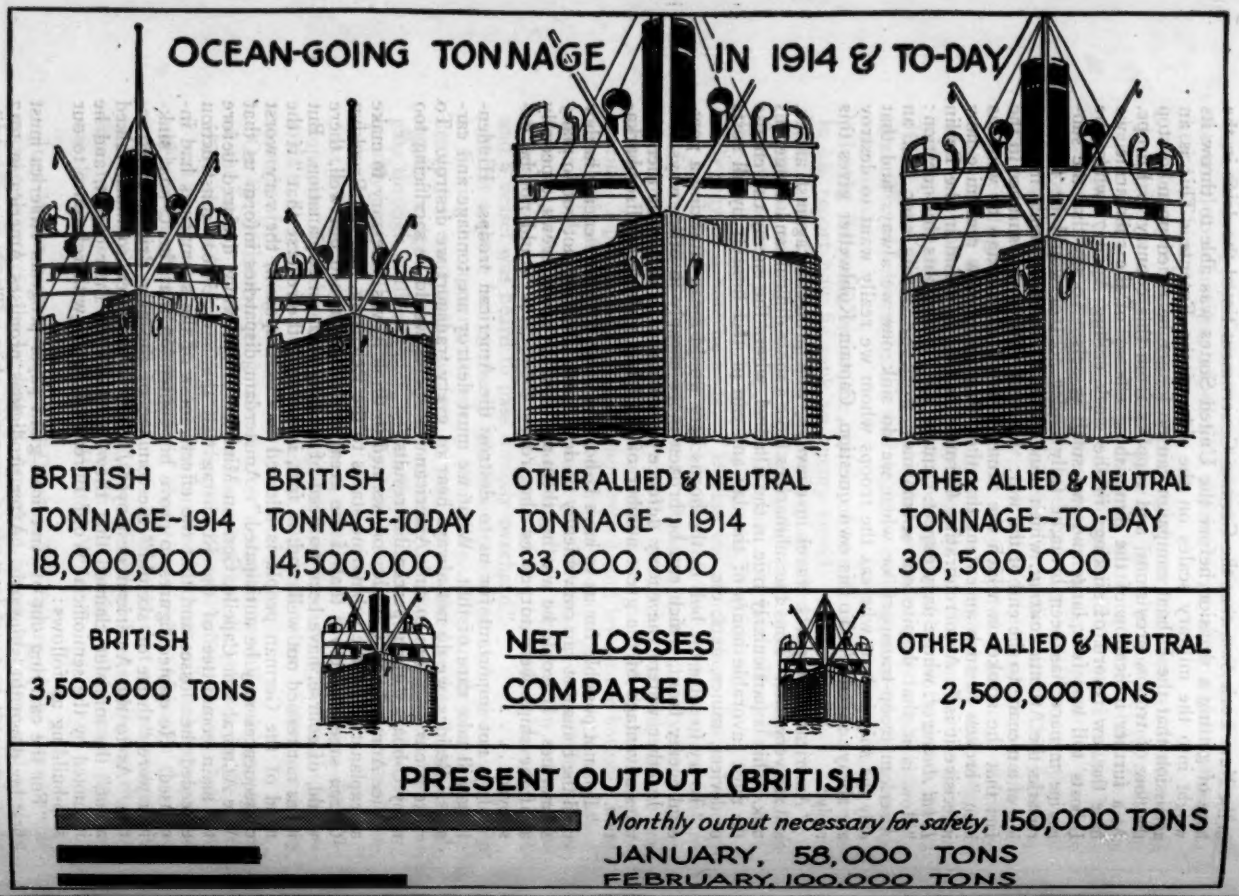
"In other waters the enemy defence is not quite so easy, but there he takes advantage of the great number of available harbors of disembarkation.

"It is not possible for us to have U-boats waiting off every enemy harbor until the transport can conveniently be destroyed. We have not got so many submarines. It would be wasting them and their precious crews, especially as if the ships were torpedoed the troops themselves would not be destroyed. . . . .

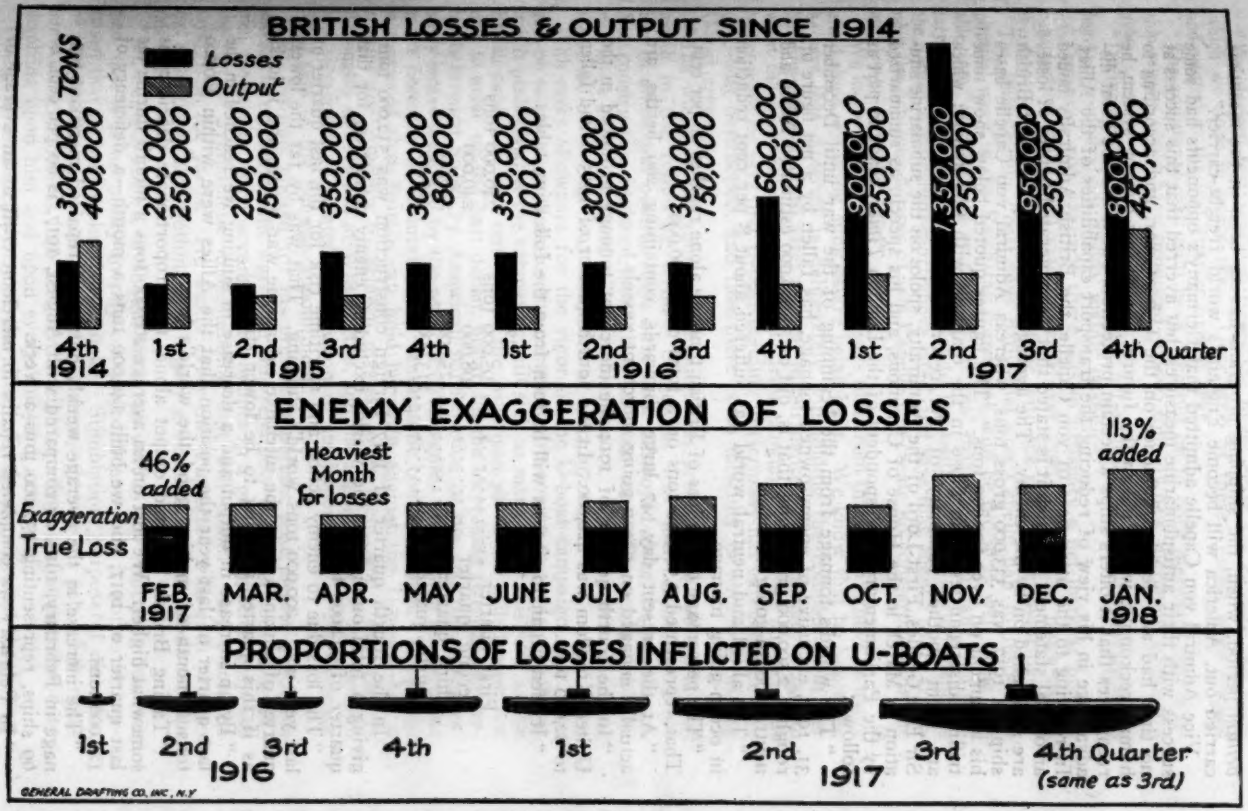
"It is not important for us to destroy the American troops. Hindenburg will take care of that. What we must destroy are tonnage and cargoes. Besides, we do not always hear of every transport we destroy. To make it our only aim to sink American transports would be sacrificing too many U-boats without perceptible results."

Vice Admiral von Capelle, too, seemed to think it was necessary to make an explanation of the submarine status to the Reichstag, and the Brooklyn *Citizen* sagely observes that if the great drive had turned out well, there would, of course, have been no need of making such an explanation. But it has not turned out well, and, in fact, is so much the reverse that "if the mind of the German people is allowed to dwell upon it, the very worst consequences may be anticipated." Amsterdam dispatches inform us that Vice Admiral von Capelle, German Minister of the Navy, declared before the main committee of the Reichstag that the new U-boat construction exceeded the losses and that the effectiveness of the submarines had increased. He quoted figures to prove his contention that the U-boat sinkings were "thrice or sixfold" the tonnage of the new British construction. As to the American destroyers, "which had been so much talked about," the minister claimed that they had failed in their object, and he is quoted by the semiofficial Wolff Bureau of Berlin with reference to our ship-building as follows:

"For the carrying out of America's giant paper program America must first lay down the shipyards. After prodigious promises America in 1917 built 750,000 gross register tons of sea-going ships. The large mercantile fleet placed on order America does not want for the war, but the *post-*


OCEAN-GOING TONNAGE IN 1914 & TO-DAY
BRITISH TONNAGE-1914 18,000,000
BRITISH TONNAGE-TO-DAY 14,500,000
OTHER ALLIED & NEUTRAL TONNAGE – 1914 33,000,000
OTHER ALLIED & NEUTRAL TONNAGE – TO-DAY 30,500,000
BRITISH 3,500,000 TONS
NET LOSSES COMPARED
OTHER ALLIED & NEUTRAL 2,500,000 TONS
PRESENT OUTPUT (BRITISH)
Monthly output necessary for safety, 150,000 TONS
JANUARY, 58,000 TONS
FEBRUARY, 100,000 TONS

JANUARY, 58,000 TONS
FEBRUARY, 100,000 TONS



THE WAR WITH THE U-BOATS; BRITISH ADMIRALTY FIGURES OF LOSSES AND GAINS.

bellum period, when, the shipping program having been in the meantime carried out, America will become England's world freight-carrier."

Vice Admiral von Capelle admitted that Germany's opponents had some success with their antisubmarine measures, but averred that this success at no time had any decisive influence on the U-boat war, and according to human reckoning, would not in the future. As to our convoy system, he recognizes that it offers ships a certain protection, but it has the great disadvantage in his view of reducing the transport capabilities of the Allies. In replying to the utterances of von Capelle, the British Admiralty issued an official statement in which it is stated that "exaggerated figures of losses are still relied on by the enemy. The average of monthly losses of British ships in 1917 was 333,000 gross tons, whereas Admiral von Capelle bases his argument on over 600,000 tons." The figures quoted below show some trifling discrepancies from those in the diagram with this article; which are from another summary of the report of the British Admiralty. Sir Eric Geddes, First Lord of the Admiralty, spoke on the submarine situation in March in the House of Commons, and his speech, as summarized by the Parliamentary correspondent of the London *Times*, reads in part as follows:

"The world's tonnage from the beginning of the war until December 31, 1917, exclusive of enemy-owned tonnage, has fallen by a net figure of, roughly, 2,500,000 gross tons, that is, out of 33,000,000 estimated Allied and neutral ocean-going tonnage.

"The allied and neutral world has suffered about 8 per cent reduction in ocean-going tonnage.

"The percentage of net loss of British tonnage alone reaches 20 per cent. That represented 3,500,000 tons on a total of 18,000,000.

"At the present day, 47 large shipyards, containing 209 berths, are actually engaged on ocean-going merchant vessels.

"In the fourth quarter of 1914 the merchant tonnage produced in the United Kingdom was 420,000. In the fourth quarter of 1915 it had fallen to 92,000 tons.

"It then began to rise, as will be seen from the following table:

	1916	1917
First quarter	95,000 tons	246,000 tons
Second quarter	108,000 "	249,000 "
Third quarter	125,000 "	248,000 "
Fourth quarter	213,000 "	420,000 "

"In the fourth quarter of 1917 foreign construction was 512,000 tons, giving a total output for the world, excluding enemy countries, for that quarter of 932,000 tons.

"The loss due to enemy action and maritime risk for the last quarter of last year was 1,200,000 tons world's shipping. That was by far the lowest quarter of sinkings since the intensive submarine war began, and it looks as if this quarter is going to be lower still.

"By an increase in output and a decrease in sinking we reached in the last quarter of last year the position that the Allies were within 100,000 tons a month of making good the world's loss.

"Taking British loss and output alone, the proportionate deficiency is somewhat higher. We lost on an average 260,000 tons a month during the last quarter of 1917, and we built 140,000 tons a month—a deficiency of 120,000 tons.

"The increase in the average weekly output of repaired merchant tonnage in February, 1918, as compared with August, 1917, is 80 per cent, or 69 ships, representing 237,000 tons a week.

"In February we completed repairs to merchant craft at an average of 166 ships a week, representing more than 500,000 tons.

"We docked last year ten times the naval craft for repairs and refits which we dock in peace time. Over 3000 of these vessels were docked and refitted in the last quarter of last year.

"The additional men who have been put on to both merchant and warship repairs could have produced 500,000 tons of new merchant tonnage a year.

"During the last seven months the net addition to labor in private yards has been round about 18,000, mainly unskilled.

"Compared with January, there was in February a net increase on new construction, hulls, and machinery of over 2500, which is as much as the merchant yards can digest in the time with the skilled men available."

The Philadelphia *Press* says flatly that von Capelle had to justify his piratical work to the Reichstag committee, and he did it as well as he was able, but "in reporting secretly to the real masters of Germany, the military clique, he probably came nearer to the truth." This journal mentions the British Admiralty report above cited, and says that, thanks to its frankness, the fictitious figures of von Capelle can create no consternation in the anti-German world, for—

"We know that he lies when he says that from three to six times as many allied ships are being sunk as are being built. We know that he lies when he says that America is deliberately withholding the completion of her building program until after the war in pursuance of a mercenary design to wrest the commerce-carrying trade from England. And we suspect that he lies when he says that U-boat building in Germany has exceeded the rate of U-boat destruction, and that there is no difficulty in obtaining willing U-boat crews.

"The worst of the shipping situation was presented to the world last month in the following terms: Somewhat less than 12,000,000 gross tons of allied and neutral ships have been destroyed since the war began. New construction replaced more than 5,000,000 tons. The seizure of German ships added two and a half millions more. Thus the net deficit for the period of the war was calculated as 2,632,297 tons.

With every allowance for the vigor of the U-boat campaign, the *Press* goes on to say, as well as for the constantly improving methods of fighting it, it is probable that the submarine will sink as many ships this year as the British yards can turn out. Thus the American yards are called upon not only to make up the past deficit, but to fill the increasing tonnage requirements brought about by American participation in the war on a progressively larger scale and by the reduced effectiveness of common carriers due to the necessity of maintaining a transatlantic convoy system. The *Press* is convinced that Britain can hold her own against the U-boats, but it remains for America to achieve mastery over them, and "this fact is thoroughly understood at Washington, and the appointment of Mr. Schwab is a significant, if belated, recognition of its importance." The Newark *News* says of the Schwab appointment:

"Mr. Schwab, chosen for his present important post primarily for his success in relations with war-labor, his reputedly fair treatment of workmen, the results so far accomplished by him in a private capacity, bespeaks the sort of sympathetic understanding that will count. 'My place,' he says, 'is in the yards.' He wants every one connected with each yard to feel as he does—that nothing will be any good to any of us unless we win this war.

"Mr. Schwab knows, or should know, as well as any American business man, that it is no policy to rely on overconfidence. It is not to be presumed that he will make that mistake. Stimulation, purposeful direction of ship-building activities—in a word, ships—that is his job. To translate American desires into acts is the high privilege and imperative duty devolving upon him and upon every shipyard associate."

Testimony to the efficiency of the allied effectiveness against the U-boat is found in a dispatch from a French seaport in which Mr. James Kerney,

director for the Franco-American Committee of Public Information, is quoted as saying: "A French vice admiral told me that it was due to the great skill and cooperation of the American Navy that no tonnage has been lost on this coast for three months. He was most enthusiastic in his praise of Rear Admiral Wilson, who seems to have captured all this part of France. The depth bomb, listening device, and hydroaeroplanes in the hands of the Americans have conquered the submarines." Washington dispatches to various dailies disclose confidence among officials that the submarine menace is doomed, and in reply to the boast of Vice Admiral von Capelle that U-boat construction is exceeding losses, a correspondent of the Philadelphia *North American* cites navy officers as predicting that the menace will be wiped out by August, and perhaps by June. The *North American's* correspondent informs us further:

"Despite the vaunting passage in von Capelle's address that speaks of U-boat commanders so well trained that they manage to sink 'from three to four ships in succession belonging to the same convoys,' America has lost since the war began only 14 vessels, aggregating 75,000 tons.

"The outstanding facts in refutation of von Capelle's attempt to cheer the German people are these:

"The total neutral and allied tonnage is now approximately 42,000,000 tons;

"America will add this year at least 3,000,000 tons, possibly more than 4,000,000, according to some estimates;

"Great Britain will add at least 1,800,000 tons more, according to von Capelle's own admission;

"The total of other construction on the basis of 512,000 tons the last quarter of 1917, a conservative basis in view of winter-weather conditions, will amount to at least 2,048,000 tons, most of which will add to allied operations directly or indirectly.

"Japan already has agreed to build an additional 200,000 tons of shipping this year for America, and probably will build another 200,000.—*Literary Digest*, 4/5.

THE PERISCOPE.—It is a well-known fact that at a height of one foot from the water an object can be seen at 1.32 miles; at six feet elevation the range of vision is increased to 3.23 miles while at ten feet the horizon is increased to 4.16 miles. This in clear weather puts great limitations upon the sight of a submarine periscope, as all allied merchant vessels are keenly on the lookout for such. From the above it is also very evident that aircraft have extraordinary value in scouting for submarines, as at 25 feet elevation an object can be seen 6.59 miles away; at 100 feet, the range of vision is increased to 13.17 miles; at 500 feet, the line where sea and sky meet is 29.45 miles away.

At a mile high an aeroplane has a range of vision of 95.7 miles. At this height, with powerful telescopes, an aircraft can sweep an area of about 300 miles. In order to distinguish the camouflaged vessels of the Allies, the Germans have fitted their latest periscopes with ray filters, which clearly bring out the outlines of such otherwise invisible vessels.—*Marine Engineering and Naval Architect.*

SINKING OF U-BOATS IS STEADILY INCREASING.—London, May 8.—"The sinking of German submarines steadily increases," said Thomas MacNamara, parliamentary secretary to the Admiralty, in a speech at Bristol. He added that the destruction of merchant ships has fallen steadily month by month. The output of tonnage is now well ahead of that in 1917. The demand for immediate ship production on England is now large, however.

Mr. MacNamara declared that the big program made for England and America would take time to mature.—*Baltimore American*, 8/5.

THE PLUS AND MINUS OF U-BOAT WARFARE.—All of us who believe that the psychological war is as important if not more so than the war of arms,

will rejoice that the British Admiralty has decided to give, periodically, the full facts as to tonnage sunk and tonnage built among the allied nations. Certainly the first statement of this kind, as made by Sir Eric Geddes, is reassuring. The total of allied and neutral shipping losses, due to enemy action and marine risk in gross tons since the beginning of the war, is 11,827,572 tons. During that time, the Allies and neutrals built 6,606,275 tons of new shipping. Furthermore, there is a total of 2,589,000 tons of enemy vessels, either captured or taken over and brought into service. It follows that the net losses to the Allies and the neutrals up to the 1st of January, 1918, is 2,632,297 tons.—*Scientific American*, 27/4.

A BAD TIME UNTIL AUGUST.—Admiral Lord Jellicoe, in an address at Hull last month on the submarine situation, said that the reason losses by submarines in the Irish Sea were so heavy was because there was shoal water on each side of the sea, at the bottom of which "the submarines could lie for 48 hours at a time." When they "got a craft on to her the submarine would sit at the bottom until the trouble was over." He said that the difficulty of chasing the submarines into their own ports was that, for a radius of 150 miles around Heligoland Bight, the water was shoal and the submarines could sit at the bottom. At night a submarine could be seen at a distance of only 200 yards and the shoal area stretched for some 300 miles from Denmark to the Dutch Islands. "I am afraid," Lord Jellicoe said, "we are in for a bad time for a few months . . . . but I have confidence that by about August we really shall be able to say the submarine menace is killed."—*Scientific American*, 27/4.

U-BOAT SINKINGS STILL EXCEED SHIP OUTPUT.—"During the year 1917 German submarines sank more than 10,000,000 dead-weight tons of shipping —11,000,000 would be nearer the truth"—said Bainbridge Colby, member of the United States Shipping Board, before a meeting of the Executive Committee of the Merchants and Manufacturers' Association to-day.

Last month, he said, the sinkings exceeded the combined tonnage built by Great Britain and the United States during that month. More than 11,050 large British steamers have been sunk since the war began.

"The submarines to-day," Mr. Colby continued, "are sinking ships faster than are built at present, and the only way to cope with the under-water assassins is to build ships with such a frenzy that the lanes of the ocean will be choked and the submarine pirates will be beaten. We must have ships. The submarines are still sinking more ships than are being built. Without ships we cannot send men, food or munitions to the other side. It is for our workingmen, our employers to realize that we can, by their enlightened impulse, achieve that unity of purpose which will win for us."

As a result of this expansion of the havoc wrought by the German U-boats the committee unanimously adopted a resolution pledging its fullest support to the government ship-building program.

Holden Evans, President of the Baltimore Dry Dock and Shipbuilding Company, announced that they had laid the keel of a vessel yesterday which he promised would be launched in 50 days.

A White Paper, published March 22, 1918, placed the gross merchant tonnage lost in enemy action in 1917 at 6,623,623 tons, distributed as follows:

Period	British	Foreign	World's total
First quarter	911,840	707,533	1,619,373
Second quarter	1,361,870	875,064	2,236,934
Third quarter	952,938	541,535	1,494,473
Fourth quarter	782,889	489,954	1,272,843
Total	4,009,537	2,614,086	6,623,623

The same White Paper revealed the output to be as follows:

Period	British	Foreign	World's total
First quarter	246,239	282,200	528,439
Second quarter	249,331	377,109	626,440
Third quarter	248,283	368,170	616,453
Fourth quarter	419,621	512,402	932,023
Total	1,163,474	1,539,881	2,703,355

The net loss for the year was shown to be 3,920,268 tons; the net loss since August, 1914, 2,632,297 tons.—*N. Y. Times*, 4/5.

SUBMARINE SINKINGS REMAIN CONSTANT.—Recent Berlin advices are to the effect that 702,000 tons of shipping were destroyed by the submarines of the Central Powers in December, last. For the first 11 months of Germany's intensified submarine warfare, no less than 8,958,000 tons gross were sunk, it is claimed. Attention is called to the fact that the list of sinkings recorded in the last month of 1917 is noteworthy in several respects. The loss inflicted on the world's shipping was 100,000 tons greater than in November, and 30,000 tons more than in September and October. An attempt is also made to estimate the relative percentage of the total tonnage operating in the war zone sunk from month to month. In the following table, it is assumed that one-third of the tonnage available for the three blockaded countries, Great Britain, France, and Italy, is permanently in the war zone.

Month	Tonnage in war zone	Tonnage sunk	Per cent
February	8,217,000	781,500	9.5
March	8,125,000	885,000	10.9
April	7,958,000	1,091,000	13.7
May	7,817,000	869,000	11.1
June	7,667,000	1,016,000	13.5
July	7,508,000	811,000	10.8
August	7,367,000	808,000	10.9
September	7,200,000	672,000	9.2
October	7,058,000	607,000	9.5
November	6,900,000	607,000	8.8
December	6,733,000	702,000	10.4

How the tonnage operating in the war zone is estimated from month to month is not explained. According to the above figures, the tonnage in the war zone dropped from 8,217,000 tons to 6,733,000 tons between February and December last. This is a loss of 1,488,000 tons, or approximately 18 per cent. It would seem from this as though the Germans were willing to concede that in 11 months of ruthless submarine warfare they had only diminished the tonnage available for the Allies by one-fifth.—*Nautical Gazette*, 28/2.

U-BOATS HAVE MURDERED 14,120 NON-COMBATANTS.—There is a danger lest familiarity, even with such a monstrous crime as unrestricted U-boat warfare, should breed indifference to its enormity. Therefore, it is well to bear in mind that, except when the attack is made on fighting ships or transports carrying fighting men, the torpedoing of ships and sending men to their death far out at sea, is simply murder, unredeemed by any extenuating circumstances whatsoever. Just how great a bill of indictment is being drawn up by the German Admiralty against itself is seen in the statement given by the Government Leader in the House of Commons early last month, that up to February 5, 1918, the German U-boats had killed 14,120 non-combatant British men, women and children. This be it noted, is exclusive of the murders done upon peoples of other nationalities.—*Scientific American*, 9/5.

U-BOATS SUNK EXCEED THOSE BUILT.—Announcement from Paris that in the last three months more submarines have been sunk than have been built, bears out recent unofficial statements here on the submarine situation. It has been no secret that officials here have felt more encouraged within the last few months than at any time since the unrestricted submarine campaign began.

Merchant ship construction by the United States and the Allies already has passed the real danger point and ships are being launched faster than they are sunk. Officials pointed to this fact to-day as proof of the wisdom of the American policy of building an enormous merchant fleet.

As the supply of submersibles begins to diminish the biggest part of the shipping problem of the Allies begins to vanish. Aside from the general effect of a decrease in the number of submarines, officials look for it to have a decided effect on German morale. Every submarine sent to the bottom carries with it a trained crew, which is becoming increasingly harder to replace.

In February and April the number of submarines destroyed was three less than the total destroyed in the previous three months. These results, the minister declared, were due to the methodical character of the war against submarines; to close co-ordination of the allied navies; to the intrepidity and spirit animating the officers and crews of naval and aerial squadrons and to the intensification of the use of old methods and the employment of new ones.

"The situation is most favorable," the minister continued, "but it does not authorize the slackening of effort. It is necessary to redouble it, as the enemy has put new submersibles into service and is trying a fresh offensive, in which he plays his last stake."—*Washington Evening Star*, 13/5.

MILITARY

THE GERMAN PURPOSE.—"Their purpose is undoubtedly to make all the Slavic peoples, all the free and ambitious nations of the Baltic peninsula, all the lands that Turkey has dominated and misruled, subject to their will and ambition, and build upon that domination an empire of force upon which they fancy that they can erect an empire of gain and commercial supremacy—an empire as hostile to the Americas as to the Europe which it will overawe—an empire which will ultimately master Persia, India, and the peoples of the Far East. In such a program our ideals, the ideals of justice and humanity and liberty, the principle of the free self-determination of nations upon which all the modern world insists, can play no part. They are rejected for the ideals of power, for the principle that the strong must rule the weak; that trade must follow the flag, whether those to whom it is taken welcome it or not; that the peoples of the world are to be made subject to the patronage and overlordship of those who have the power to enfore it."—*The President's Baltimore address.*—*Notice to Mariners*, 20/4.

CHASED FROM EAST AFRICA.—*Germans Still in Flight, Pursued by British and Portugese.*—London, April 27.—Reporting military operations in the East African battle zone, an official statement issued to-day by the War Office says that the advance of the British and Portuguese forces, which are pursuing the German troops, which crossed the German East African border into Mozambique, is proceeding under more favorable weather conditions. The text of the statement reads:

Since April 17 the convergent advance of General Northey and General Edwards' troops has proceeded under better weather conditions. The main enemy force is in the vicinity of Namungo. British and Portuguese troops are moving in the direction of Msalu River, while further south other British and Portuguese columns have been disposed north and south of the River Lurio.—*N. Y. Herald*, 28/4.

INTERNED GERMANS OVERPOWER DUTCH GUARDS; 1000 FLEE.—*Report of Ultimatum to Holland Causes Uprising in Which Many Escape.*—Amsterdam, Sunday.—The report current last week that Germany had sent an ultimatum to Holland led to a revolt among Germans interned at the Vapanveld camp, according to a dispatch from Hattem, Holland, to the *Het Volk*.

The guards are said to have been overpowered by 1000 Germans, who fled in all directions. Frontier points were notified immediately and mounted police searched the countryside.

Many Germans succeeded in passing through Almelo or Hengelo on the way back to Germany, but the police rounded up the majority of them in groups of 25 or 50.—*Baltimore Evening Sun*, 27/4.

STRICTER WATCH BY DUTCH ON FOREIGNERS.—London, Saturday.—A bill introduced in the Dutch Parliament contains provisions for stricter supervision of foreigners resident in Holland during the present extraordinary war situation, according to a Reuter dispatch from The Hague. As it is considered that there are various objections to the expulsion of foreigners and as there may be undesirable elements among them, special regulations relative to them are believed to be necessary.—*Baltimore Evening Sun*, 27/4.

GENERAL BELIN HEADS VERSAILLES COUNCIL.—The Versailles Interallied War Committee, according to an official despatch from France, is henceforth to be constituted as follows: President, General Belin, France; members, General Sackville-West, for Great Britain; General Dirobilant, for Italy, and General Bliss for the United States.—*N. Y. Herald*, 23/4.

GERMAN PRISONERS TO WORK ON ROADS.—The War Department plans soon to offer to the states an opportunity to obtain as road builders German prisoners held in this country. Some of these men are already engaged in road construction in the vicinity of Forts McPherson and Oglethorpe, Ga., but the department intends to enlarge the scope of this and permit states to bid for their services.

States obtaining the prisoners must pay their maintenance, but the government will pay for guards, medical attendance and other incidentals, including a small amount of money for tobacco and the like.

Only Enlisted Men to Be Used.—Only enlisted men will come under the plan, for under The Hague conventions officers are exempt from manual labor.

At present this government is negotiating with Berlin through the Spanish representatives over questions of pay, so that there will be no inequality between the amounts Germany pays American officers and what we pay German officers.

The department has plans for supplying a distinctive uniform to the prisoners.

Some Want to Stay Here.—German prisoners like the United States and don't want to go back to Germany. It was learned to-day that some of them had secretly inquired from the War Department if they could remain in this country after the war and had expressed a dread of returning to the Fatherland.

The appeals carried the strong suggestion that the men were tired of Teuton militarism and pleased with American treatment and American freedom.

The War Department replied to their inquiries that it was unable now to announce a policy on that question. It is known, however, that the present plans are to return all prisoners to Germany when the struggle ends.—*Baltimore Evening Sun*, 22/4.

GIVES GERMAN REGULATIONS REGARDING REMITTANCES TO CIVIL AND MILITARY PRISONERS.—The War Department authorizes the following:

The following telegram has been received from the American minister at Berne, Switzerland, regarding regulations in force in Germany with respect to remittances from their home countries to interned civilians and prisoners of war:

"The Spanish ambassador at Berlin has transmitted a note dated February 15, 1918, from the German War Department, stating that there are no restrictions in regard to the remittance of money for civilian and military prisoners. The money sent is placed to the prisoner's credit, who may spend it freely with the following limitations:

"A. Military prisoners.

"1. Sixty marks weekly may be spent by officers and others of similar rank.

"2. Fifty marks weekly by non-commissioned officers and men.

"B. Civilian prisoners.

"1. Sixty marks weekly for men of better social position.

"2. Fifty marks weekly for others.

"With a view to obtaining particular articles, the prisoners are allowed at any time to draw on their credit."

No Guarantee of Delivery.—All moneys thus sent to interned civilians and prisoners of war should be remitted through the Bureau of Prisoners' Relief, American Red Cross, Washington, D. C. All money thus sent through the Red Cross should be remitted in the form of check or postal money order, payable to the American Red Cross. The information is imparted to all concerned that, while the American Red Cross has handled many such remittances and will be glad to handle all future remittances of a similar nature, no guarantee can be given as to the ultimate safe delivery of such remittances. It is also noted for the information of all concerned that remittances so made will probably not be delivered to addresses by the German Government in the form of cash, but rather in the form of credit on prison exchanges.—*Official Bulletin*, 29/4.

The British report of the action in the Struma Valley on April 16 shows that Greek troops did well, and reconquered several villages ceded to the Bulgarians under the old régime. To the north of the Greeks, British troops gained two villages to the southwest of Demir Hissar.—*London Times*, 18/4.

MR. WILSON'S GREAT STROKE.—By Arthur Pollen.—I doubt if the majority of English people really appreciate the full significance of what President Wilson, seemingly at the suggestion of General Pershing, has decided to do, not only with the American troops in France, but with all the troops that can be got to France in the immediate future.

The decision in itself is that the American battalions are to be brigaded as occasion requires with the French and British battalions, and to be sent into the firing line—of course, under their own colonels, majors, and company officers, but—as units controlled by French or British Brigadier-Generals of Division and so upwards. To many people, the President seems, in this, first to have done no more than meet a very clear necessity of the situation, and, secondly, only to be following a course for which he himself and the British Admiralty have already supplied precedents. As to the first point, I see it stated that there are in France a large number of American troops available for the purposes designated, a number which must very much exceed the total of the allied losses in the battle which still continues.

Of the timely value of this reinforcement there can be no two opinions. As to the second, a precedent for the principle involved has existed for several months in the case of the American destroyers operating in the Atlantic under the ultimate command of one of the most experienced and most brilliant of our senior admirals. They are, of course, only part of the forces at the disposal of this officer, and to make the analogy complete, Admiral Sims commanded the entire combined forces himself for a period.

This reciprocal action by the governments of the United States and Great Britain is, I believe, entirely without parallel in history. It has often happened that allied forces have worked together under a Generalissimo, but in each case every unit, and every individual in it, looked to the national commander-in-chief for orders. What was unique in this Anglo-American naval arrangement was that the captains and officers of English and American ships came under the direct orders of an officer not of their own nationality. Those who have been privileged to see at first hand how this arrangement has worked in practice have been deeply impressed by the skill and tact, no less than by the fine warlike and patriotic spirit which has alone made its complete success possible. And it is not a far-fetched idea to suppose that the real authors of President Wilson's epoch-making decision are Rear Admiral Sir Lewis Bayley, Vice Admiral Sims, and the officers and men of both nationalities who have served under them.

But, precedent or no precedent, the case of the army is in reality an infinitely more striking affair. For seamen are as a race apart. The long training and the sustained self-devotion necessary to gain mastery of a science and a craft incomprehensible to the lay segregate the sailor so completely from the landsman that when a common cause bids them unite forces, it is almost easier for English naval officers to feel the bond of brotherhood with American colleagues than with brother Englishmen not of their own high and select calling. The professional training of the soldier confers no parallel aloofness and, where you have the citizen soldier, there is almost no qualification of his purely national prejudices and characteristics. Without question, every American who volunteered for this war—and nine out of ten of those in France must be men who had gone into training before the draft came into force—did so to become a member of a purely American force, to fight under the Stars and Stripes for the credit and glory of his own country, to be commanded by American generals, and to be led and directed by an American staff.

To sacrifice so much of this ideal, to consent to so much of the merging of so much of the national identity—this would be extraordinary in any event. It approximates to the heroic in the case of a nation so singularly self-conscious of its nationality. The President has not, of course, by any means abandoned the building up of an American Army with its whole apparatus of generals, staff, and so forth. But the decision not to wait for the realization of this plan before enabling his ardent countrymen to strike a blow for justice and freedom, has necessarily postponed the army's creation, and to do this called for moral courage of a very high order. It is a thing that claims our sincere gratitude, and not the least of its many pleasing aspects is the very obvious satisfaction of the people of America with their President's decision.

Three months ago, in these columns, I offered my tribute to the unlimited willingness of the American people to make every effort and every sacrifice demanded of them for victory; but it did not occur to me that this particular demand would so soon be made. But circumstances have made it necessary, and great and unusual as the event is, those who realize that America's determination to fight and not stop fighting till victory is won, will not be surprised that the President has not hesitated to do what to a more narrow view of national dignity would have seemed prohibitive, or that the nation as a whole should have endorsed this finer vision with unanimous enthusiasm.—*Land and Water*, 11/4.

MILITARY CRITIC ON NEXT PHASE OF THE GREAT BATTLE.—By Military Expert.—Just what Germany's plans for a renewal of the German offensive are no one can even make an intelligent guess. Her situation in the west is far from being comfortable and is one that cannot be maintained without a material change in the formation of her battleline.

To drive a salient into an enemy's lines is often an advantage if it is followed up by a widening process which gives the troops which occupy

it space in which to maneuver. But if it cannot be widened it is apt to be a source of extreme danger. This is the general situation which confronts the Germans both in the north and in the south. Whatever their plans must be, therefore, they must involve a widening of the bases of the two salients.

In the north the situation is peculiarly exacting by virtue of the depth of the wedge in relation to the short distance between the heels at the base. This is further aggravated by the topographical advantages which are against the Germans. Beginning at Messines Ridge and extending west, there is a long line of hill positions, all of which the Allies hold except the most easterly point at Kemmel Hill. Beginning at Vimy Ridge and extending northwest there is another ridge jutting out of the plains, all of which is in British hands. Between these two ridges are the Germans. They cannot advance at the point, as matters stand, since the further westward they go the sharper becomes the point of the wedge and the closer to its sides are the two ridges which eventually almost meet. The Germans cannot stand still, because they are down in the plain of French Flanders where every move they make is visible to the Allies on the northern bank of heights. It is impossible for them to make any concentrations of men or of guns, for, at the first attempts, they will come immediately under the fire of the British and French artillery on the heights.

On the southern leg of the salient the same situation exists. In fact, there is scarcely a point which from one side or the other does not come within the vision of the allied observation posts. Since, then, Germany cannot advance at the point and cannot remain where she is, there remains the problem of breaking through one of the sides and so extending the possible front of operation.

Fighting in the North.—The fighting which took place about this northern salient during the week was apparently designed to secure a local betterment of position, and, at the same time, to feel out the British strength at various points. The principal one of these attacks was on the Flanders front between La Clytte and Voormezeele. The Germans in this attack used two divisions and, while the attacks on the two flanks of the front engaged were not pushed, that in the center continued for several days.

The main point of attack was about Vierstraat. This village is located near the tip of the spur which branches off from the main ridge between Messines and Kemmel toward the eastern side of Lake Dickebusch. It is limited on the north by Ridge Wood, a small clump of trees about which there has been the heaviest kind of fighting since the German offensive in Flanders began. The object of the Germans here was to push the British off this high ground down into the plain on the north. This would have represented a gain of but a few hundred yards, but it would have put the Germans further to the rear of the Mont Scherpenberg positions, which would in itself have placed them in a much better position for a subsequent attack when the offensive on a large scale reopened.

At the central point of the attack the Germans succeeded in forcing their way forward, but somewhat later a counter attack restored the British lines and the fighting ceased without result. Later another attack was delivered a little further west, just north of Kemmel. This attack passed through the same stages as did the first. There was an initial gain followed by a counter effort which restored the old positions, after which the fighting died down. The week's result is that, on this front, there has been no change in the situation.

Allies Gain in South.—In the south the initiative has been with the Allies during the whole week. The British have maintained a more or less consistent pressure against the German lines between the Somme and the Ancre and between the Somme and the Avre. The allied lines here have been pushed eastward somewhat and the positions bettered through obtaining a firmer grip on the various plateaus across which the lines run. The general situation, however, is much the same as it was last week.

The persistent inactivity of the last two weeks has in a measure left us completely in the dark as to just what is happening or is about to happen. The Germans, it would appear, had, as their greatest chance of success, speed in the attack, following up each blow with another, leaving no appreciable intermission between them. Delay, it was argued, would be fatal, as it would give the Allies a chance to dig in and make the German task much more difficult than it was when the offensive began.

There is, of course, an element of truth in this. Obviously the Allies can no longer be taken by surprise. The German attack, when it is resumed, must follow along the line of previous efforts, and be kept within the narrow limits fixed by the Germans themselves. It would not in any way further the consummation of their plans for them to strike in a new quarter. It would, indeed, be but a confession of their own weakness and an admission that their great offensive, which had been so widely advertised, was a failure. It is known, then, that the attack must come either in Flanders or along the Somme fronts. The situation in Flanders is well understood. The Germans must break through one or the other of the line of heights by which they are penned in.

Situation Around Amiens.—On the southern front the situation is much more simple, at least up to a certain point. Between the Ancre and the Noye Rivers, which territory is the vital sector of the southern part of the line, the country is very heavily rolling and is well cut up with streams of varying size, all, however, radiating to a common center—the Somme between Moreuil and Amiens. There is a series of angles formed by the various river junctions into which the Germans must go. They are astride all of the streams except the Noye River, a fact which, of course, operates in their favor, as the rivers cannot be considered as defensive barriers behind which the Allies, if forced to retreat, can take refuge. At the same time there is the disadvantage of inability to secure close co-operation between the various army groups into which the rivers divide the German line. The banks of all the streams in question have the same characteristics.

The ground rises very sharply from the banks until it reaches a plateau of considerable size, the plateaus being crossed by the battlelines, as these lines extend from north to south. There are, consequently, many good defensive positions to which retirement can be made if need be. The principal difficulty of the German position, however, is not the defensive position behind which the Allies can stand if driven out of their present lines, but the apparent advantage of being astride of the rivers.

In order to throw the Allies into the state of confusion necessary for a material advance in this section of the front, the Germans cannot content themselves with an advance into any single one of the angles between the rivers. To do this would merely create a number of sharp definitely limited salients, each of which would be a point of danger by reason of the fact that it could be practically ruined by artillery fire from all sides. And yet, to advance on a wide front, is an operation which requires the closest kind of co-operation between all units. It is difficult to see just how such co-operation is obtainable in a line divided into numerous parts by topographical obstacles. Nevertheless, it is consistently reported that the bulk of the German forces in France is concentrated on the Somme front between the Somme and Arras.

This is certainly a most important section of the line. Bitter fighting lasted about Bucquoy for many days. This fighting was designed to flank the defences of Arras—the heights of Notre Dame de Lorette and of Vimy. It is upon these defences that the British strength on the southern side of the Flanders front rests. This, therefore, would be a logical point of attack, as it would accomplish, if successful, the double object of widening both the Flanders salient and the front on the south. There has been no indication, however, other than the reported concentration of German divisions, that this is the section which is to receive the next German blow. It has, indeed, been the most quiet sector of all the long German front of attack.

There have been numerous bombardments along other parts of the line. In Flanders, at all points of the salient and particularly along the river Lys near where it divides the battleline, between the Somme and the Avre and along the Avre, there have been periods of heavy cannonading. But the section north of the Somme has been almost entirely free from molestation. But this is without any special significance, since, if the Germans intended to attack on this front, there would not necessarily be much artillery firing until the attack was about to be launched.

May Foe Attack in Italy?—There is the feeling in some quarters that the Germans, realizing that they are held fast on the front in France, are preparing a diversion from the real point of attack and are concentrating for an attack against Italy through the Trentino. This does not appear likely. It is entirely possible that an offensive against Italy may break out. But it is not probable that this will mean a cessation of the fighting in France. While the Germans have met with a check, and a very decided check at that, they have not yet been defeated by any means, but, on the contrary, still possess the ability to strike again and with practically the same strength as they did six weeks ago. They surely are not ready to acknowledge the defeat of their great effort to end the war.

To attack Italy at the expense of the front in France would be equivalent to such an acknowledgment. Germany cannot do both. In spite of the fact that practically all of her available forces are concentrated in the west, she has not sufficient strength to conduct two such offensives at the same time. She never has had. In every case where an offensive was in progress it was the signal for a period of quiet on the unaffected front. If Germany did not have the numerical strength to attack both Russia and the western allies at the same time, certainly now she has not enough men to initiate an offensive on the entire western front or at two parts of it so widely separated as are France and Italy. If, therefore, an attack against Italy is staged—and there have been indications that it is preparing—it will be conducted by the Austrians without any great assistance from Germany.

Cavalry in the Great Battle.—The relative inactivity during the past week affords an opportunity to mention a most interesting fact connected with the great battle which began on March 21. It has been generally assumed that the day of cavalry lapsed with the invention of the machine-gun and the airplane. We have heard little if anything of the cavalry arm since the early days of the war, when the movement of troops ceased to be rapid and degenerated, so to speak, into the dogged persistence of the trenches. General French was criticized on more than one occasion because he persisted in keeping intact a large cavalry force safely in rear of his army for which there was no apparent use.

But cavalry has been used in trench warfare, and most brilliantly used. The cavalry pursued the Germans in their retreat in the early part of 1917 and kept closely in touch with them during the whole of their retrograde movement. The cavalry operations in the back of Cambrai, both in the British attack and in the subsequent German attack, were among the most brilliant exploits of the war. And, in the present great battle, it was the cavalry of the French which maintained connection between the right flank of the British and the French left, and which in large measure prevented the Germans from accomplishing their object of dividing the two forces and rolling up the British line.

In the early days of this attack, it will be remembered, the Germans were pushing southward against the French, who were in retreat between Roye and Montdidier, while the British were retreating westward, north of this line. Here was the danger of the break in the continuity of the line. There was, indeed, a rupture, and for a time the German plan promised success. But the French cavalry stepped into the breach, re-established the connection, and fought both as mounted infantry and as a cavalry until reinforcements of infantry came up and took over the line. This

was really the turning point of the battle, as once a definite, positive connection between the two allied armies was made, the danger that the German attack would succeed ceased.

It was largely a question of mobility, and, in many of the battles of this war, just as in many in past wars, the great mobility of a cavalry force has been utilized in stiffening a vital section of a battleline where disaster threatened. Though the development of trench warfare has undoubtedly restricted the usefulness of cavalry, it must still remain an important military arm.—*New York Times*, 12/5.

OUTCOME OF GREAT BATTLE IN FRANCE HINGING ON MAN POWER; AMERICA MUST RUSH HELP, SAYS WAR DEPARTMENT REVIEW.—The War Department authorizes publication of the following review of military operations for the week ending April 27, 1918:

The outcome of the present operations in the west depends on man power.

The Germans are relying principally on rifles, machine-guns, man power, and carefully thought-out methods of transporting and supplying munitions to the front of attack under all conditions; which means that they have developed mobility of offensive action that can only be met by countermeasures of equal potency and flexibility.

A battle of such magnitude as the one being fought in the west cannot be decided by any single engagement, yet there arise a series of crises on which the ultimate outcome depends. These crises have up to the present in a large measure resulted favorably to the enemy.

The vigorous attacks driven against the British lines were intended to paralyze the independent will power of the British command. In this the enemy has failed. Unity of command of the Allies has extended operations to the broader field of general engagements in which all the allied forces will henceforth be used interchangeably.

This change in the combat situation has materially altered the moment of decision of the offensive. Instead of the enemy being able to defeat the British Army, and then turn its full energy against the French, the Allies are now able to oppose their full united strength to the hostile attack.

It must constantly be borne in mind that the enemy is seeking a decision that will end the war. This decision can only be arrived at by the destruction of the allied forces in the field before fresh units contributed from additional levies in France and Great Britain, as well as by our own troops, can take up their position in sufficient numbers to turn the German successes to defeat.

Ours is the imperative duty of providing replacement units for the armies in France. We must be able to put fresh men in the field thoroughly and methodically trained. In addition to those already called to the colors and now in training at our cantonments, or already selected for service, very large quotas will be required in the immediate future to fill the gaps.

Operations of the week reveal that the enemy, taking advantage of the reentering angles stretching from the Avre northward and from Wytschaete to Dranoutre, has resumed operations after a period of relative calm.

German Aims Clearly Defined.—It is not difficult to follow the strategic conception of the German higher command. An enveloping movement is outlined, which, on the one hand, is to force the retirement of the British from Arras, and, if wholly successful, result in the capture of both Arras and Amiens. On the other, by the occupation of the important heights of Kemmel to wipe out the Ypres salient and throw the British line back of Hazebrouck and Poperinghe.

In the south the thrusts toward Amiens have been well contained. The British are holding firmly in the face of furious assaults.

Hangard has been the scene of very violent engagements and the enemy is here pressing the attack with great vigor. Ailly-sur-Noye and the surrounding area have been subjected to very intense bombardments and Amiens itself is being consistently shelled.

Our own forces have taken part in the battle. American units are in action in the area east of Amiens. During the various engagements which have raged in this area they have acquitted themselves well.

In Flanders the situation is less satisfactory. Last week the Germans drove a strong thrust against the segment of the line held by the Belgians. This was well met and the enemy was unable to make any headway. After a delay, during which the Germans replaced their depleted units and brought up supplies and munitions, another principal assault was launched with Mount Kemmel as its objective. In the region from the Ypres-Comines Canal to Dranoutre violent fighting has again developed, as a result of which the enemy was able to capture Dranoutre, gain the summit of Kemmel, and reach Locre. Fighting continues in this area with unprecedented stubbornness and the advance of the enemy has not been definitely checked.

The loss of Mount Kemmel is a serious menace to the British dispositions in Flanders.

Along other sectors of the front there was relatively little activity. Rheims was again subjected to a very severe bombardment and the enemy launched several unsuccessful thrusts in this area.

Northwest of Toul enemy pressure is increasing. At dawn on the 21st, after a powerful preliminary barrage, the Germans launched a heavy raid against the sector held by our men.

On a frontage of approximately 3 kilometers, in the vicinity of Seicheprey, the enemy swept over our front lines. Our men were driven out of the village which the enemy was able to hold temporarily. During the night the Germans evacuated the positions captured and we were able to reoccupy our original front lines. Along the Meuse our troops beat off another raid.

Allied aircraft was particularly active and executed a large number of raids on depots and other points of importance in the Picardy and Flanders salients.

In the Italian theater no important change in the situation took place. Reports of the Austrian offensive, which may be undertaken in the near future, are noted. Along the Piave and Asiago Plateau artillery duels continued throughout the week and small local attacks were unsuccessfully attempted by the enemy at one of two points.

An Austrian detachment endeavoring to advance west of the Brenta was dispersed.

More important news reaches us from the eastern theater this week. British and French troops have landed at Murmansk, on the Arctic coast, and are assisting the Bolsheviki and Russian Red Guards in protecting the coast and Kola Railway from attacks by the White Guards. The White Guards, supported by the Germans, made an attempt to cut the railway near Kem. In southern Finland, the Finno-German forces are still making headway. Viborg is the only city now remaining in the hands of the Red Guards.

In Southern Russia.—In southern Russia, the enemy has occupied Perekop and has advanced southward into the Crimea, having occupied Simferopol, thereby gaining control of the railway which connects Sebastopol with the mainland of Russia.

In the Balkans considerable activity prevailed.

At Cerna Bend, enemy detachments attacked the Italian line but were forced to withdraw. General fighting has developed along the whole front. The allied forces executed a number of destructive raids, especially south of Dorian.

The most important engagement of the week took place in the region of the Mount Vetrenik. This height was stormed by Serbian units and, in spite of the formidable entrenched positions along the crest, was occupied by the Serbs.—*Official Bulletin*, 29/4.

GREAT ZEPPELIN PLANT AT FRIEDRICHSHAFEN REPORTED DESTROYED FROM AIR.—In addition to the destruction by fire of the German airplane plant at Manzell, reported several days ago, the Zeppelin factory at Friedrichshafen is said to have been burned down.

According to dispatches just received from Romanshorn, the fires were caused by aerial attacks, and 150 workmen were killed or injured.

The raiding airplanes were seen from the shore of Lake Constance as they flew northward over the lake after the attack.

The amount of damage is said to have been enormous.—*Baltimore Sun*, 21/4.

POWDER FACTORIES EXPLODE IN AUSTRIA.—German newspapers received at Zurich say that two large power factories at Glasenbach, near Salzburg, 156 miles southwest of Vienna, have been destroyed, according to a dispatch to the Exchange Telegraph Company from Switzerland. The explosions, which are believed to have been caused by incendiaries, are said to have resulted in heavy casualties.—*N. Y. Herald*, 25/4.

ONE BIG GUN BLOWN UP.—A description of the destruction by French artillery of one of the long-range cannon, with which the Germans have been bombarding Paris, is published to-day by the *Petit Parisien*.

"All the signs that Bertha (a French nickname for the big German guns, referring to Bertha Krupp), was going to fire had been noticed. The smoke curtain had gone up. All around there was a chorus of loud reports. Undoubtedly, Bertha and two or three hundred 70-millimeter naval guns were all firing simultaneously to disguise the whereabouts of the big cannon.

"After a short pause the firing was resumed. This time 10 naval guns supplied the obbligato. French air observers were on the lookout, however, and French guns opened fire in their turn. The aviators signaled quickly that the result of the first salvo was most promising. Two heavy shells exploded 250 yards north of the big gun, tearing up the railroad tracks leading to the concrete gun platform. The firing was continued, getting closer and closer, until finally two enormous shells went through the camouflage. Two formidable explosions were heard and the discomfited Germans saw Bertha damaged beyond repair, with a rent 50 feet long in the barrel. The aviators reported that they could see plainly through the camouflage two gaping craters in the platform.

"French gunners then set about preparing to destroy the third Bertha, but thus far they have not succeeded, for shells arrived in Paris again during the small hours of the night."—*Baltimore Sun*, 28/4.

ITALIANS IN FRANCE, PREMIER ANNOUNCES.—Premier Orlando announced in the Chamber of Deputies that Italian troops would be despatched to the battle front in France.

The announcement, which was received with a storm of applause, was as follows:

"Italy, which follows with admiration the heroic efforts of the Anglo-French troops on the western front, could not remain absent from the battlefields of France. She wishes to bring to her allies tangible proof of solidarity, and very soon the colors of Italian regiments will fly over the fields of Picardy beside those of the French, British, American, Belgian and Portuguese, thus sealing the union which exists between the allied peoples and governments."—*N. Y. Herald*, 20/4.

MUNITION LOSSES VAST.—*But Churchill Says They Have All Been Made More Than Good.*—Winston Spencer Churchill, introducing in the House of Commons to-day the estimates for the Ministry of Munitions, of which he is the head, said that during the five weeks since the battle in France had opened they had been passing through the greatest strain, regarding the supply of war material, that had occurred in the experience of the ministry. Not only had the consumption and destruction of munitions of all kinds been proceeding at the greatest rate, but there were also very heavy loses by capture by the enemy.

"We lost," the minister said, "nearly 1000 guns by shell fire or capture; between 4000 and 5000 machine-guns have been lost or destroyed, and the quantity of ammunition, apart from that which has been fired and that which has been lost in the dumps, amounted to something between one and three weeks' total of manufacture.

"Other war materials have been used or lost in a great variety of classes and on a similar scale, but by the end of last week all the losses had been made good, and, in many cases, more than made good.

"Vast quantities of small arms ammunition have been lost or left behind, but great as the demand has been, the expenditure in the last month did not exceed the maximum potential capacity of the British factories, without touching enormous reserves which had accumulated against such a contingency. The wastage of rifles was very great, but the losses were quite easily and promptly made good.

"Our preparations had contemplated a period of supreme battle intensity from the third week of February instead of from the third week of March, so we are at present from one to three weeks to the good.

"In fact, barring unforeseen circumstances, our supply of munitions would enable us to carry on a battle at the supreme pitch of intensity until winter without compromising our requirement for 1919. This is despite the fact that 100,000 men were taken from munition factories for service in the army.

"We are making in a single week more airplanes than we made in the whole of 1914; in a single month more than we made in the whole of 1915; in three months more than we made in the whole of 1916. And we are going to make this year several times what we made last year."—*Baltimore Sun*, 26/4.

INDEX OF WAR VESSEL LOSSES MENTIONED IN THIS NUMBER

BRITISH VESSELS

1 minesweeper 1389
1 destroyer *North Star* 1383
1 submarine and 6 old cruisers sunk off Zeebrugge and Ostend
- *Thetis* 1380
- *Intrepid* ..1380
- *Iphigenia* ..1380
- *Sirius* 1380
- *Brilliant* ..1380
- *Vindictive* 1380

Destroyers 1369
7 submarines 1390

GERMAN VESSELS

10 trawlers 1377
Submarines 1297, 1371, 1389
Destroyer 1380

AUSTRIAN VESSELS

1 battleship (*Viribus Unitis* class) 1394
1 torpedo-boat 1394

UNITED STATES VESSELS

1 scout vessel No. 967.....1372
1 transport *Zaanland* 1372

DIPLOMATIC NOTES

FROM APRIL 18 TO MAY 18

PREPARED BY

ALLAN WESTCOTT, PH. D., Instructor, U. S. Naval Academy

TEUTON PEACE OFFERS INSINCERE

CONQUEST AND EXPLOITATION IN GERMAN TERMS.—In an address in New York on May 18, President Wilson spoke as follows of the prosecution of the war and the emptiness of German peace offers:

There are two duties with which we are face to face. The first duty is to win the war. (Great applause.) And the second duty, that goes hand in hand with it, is to win it greatly and worthily (applause), showing the real quality of our power not only, but the real quality of our purpose and of ourselves. Of course, the first duty, the duty that we must keep in the foreground of our thought until it is accomplished, is to win the war. I have heard gentlemen recently say that we must get five million men ready. Why limit it to five million? (Great applause.)

I have asked the Congress of the United States to name no limit (applause) because the Congress intends, I am sure, as we all intend, that every ship that can carry men or supplies shall go laden upon every voyage with every man and every supply she can carry. (Applause.) And we are not to be diverted from the grim purpose of winning the war by any insincere approaches upon the subject of peace. I can say with a clear conscience that I have tested those intimations, and have found them insincere. (Applause.) I now recognize them for what they are, an opportunity to have a free hand, particularly in the East, to carry out purposes of conquest and exploitation.

Every proposal with regard to accomodation in the West involves a reservation with regard to the East. Now, so far as I am concerned, I intend to stand by Russia as well as France. The helpless and the friendless are the very ones that need friends and succor, and if any man in Germany thinks we are going to sacrifice anybody for our own sake, I tell them now they are mistaken. For the glory of this war, my fellow-citizens, so far as we are concerned, is that it is, perhaps for the first time in history, an unselfish war. (Applause.) I could not be proud to fight for a selfish purpose, but I can be proud to fight for mankind. (Applause.) If they wish peace let them come forward through accredited representatives and lay their terms on the table. (Applause.) We have laid ours and they know what they are. (Applause.)

MR. BALFOUR ON EMPEROR CHARLES' PEACE LETTER.—The true purport of the Emperor Charles' letter to Prince Sixtus, recently revealed by the French Government, was apparently an offer to France to abandon Italy, in return for which the Emperor suggested, whether honestly or not, that he would withdraw his support of Germany. As stated by Mr. Balfour in the House of Commons on May 16, the letter was sent with strict injunctions that it should be revealed only to France and Great Britain, and not to Italy or the United States. Mr. Balfour said further that "if any belligerent country desires seriously to lay before us any proposals, we are ready to listen to them," and "we are not going to deal with them without the recognizance of our allies."

Mr. Clemenceau, according to Mr. Balfour, had exposed the falsehood that the war was being waged in order that France might obtain Alsace-Lorraine while Italy should have no consideration. Mr. Balfour added that an extended Alsace-Lorraine was not a subject which should be considered seriously.

THE CENTRAL POWERS

MEETING OF EMPERORS STRENGTHENS GERMAN CONTROL.—On Sunday, May 12, the Emperor Charles, accompanied by Foreign Minister Burian, visited the Kaiser at the German Great Headquarters. While the nature of the agreements reached at this conference was not clearly revealed, it appears that in return for a free hand in Poland, Austria bound herself more closely to Germany for a period variously stated from 15 to 25 years. Referring to the conference, the German Chancellor, Count von Hertling, spoke as follows to the Berlin correspondent of the Budapest newspaper *Az Est*:

The new dual alliance will comprise two important sections, namely, economic and military agreements. The economic agreement of Germany and Austria-Hungary is not aimed at any state whatever. We are quite entitled to harmonize our common interests and act together. We desire to utilize the possibilities which this union, and nothing else, can give us.

With regard to the military side of the discussions I must emphasize that our agreements for the future have no aggressive character. We only desire consolidation of our present relations. We also desire to remain just as closely bound together after the war as during the war, which has drawn us together.—*N. Y. Times*, 19/5.

London, May 15.—Germany, in the course of the recent conference of Emperors William and Charles, agreed to the solution of the Polish question desired by Austria, on condition that Austria-Hungary conclude a 15 years' convention with Germany, according to a Vienna dispatch to the Berlin *Lokal-Anzieger*, received in Amsterdam. Complete union between Austria-Hungary and Poland may shortly be expected, the message adds.

German newspapers say, according to an Exchange Telegraph dispatch from Copenhagen, that the Emperors selected monarchs for Lithuania, Courland, Esthonia, and Poland.

A Vienna dispatch to the Munich *Neueste Nachrichten* says that the new Austro-German alliance is fixed for a period of 20 years, includes a military convention, and provides for the closest economic and customs relations.

An official dispatch from Berlin received in Amsterdam to-day says that now that the main lines for the cementing of the alliance between Germany and Austria have been fixed, the political, military, and economic negotiations will doubtless begin shortly. It is obvious, adds the dispatch, that the political and military arrangements can be carried through faster than the economic, which will probably take several months to complete.

The phrase in the official report of the Emperors' conference regarding the consolidation and deepening of the alliance, says the Berlin *Tageblatt*, permits the assumption that the aim of the convention is a close military and political union and a complete blending of military resources.

CRISIS THREATENED IN AUSTRIA.—At the close of the week ending May 5, the Emperor Charles ordered the indefinite adjournment of the Austrian Parliament owing to Jugo-Slav and Czech agitation and inability of the government to curb parliamentary discussion. According to dispatches of

May 7, Premier Wekerle, head of the retiring Hungarian Ministry, was requested to form a new cabinet, and was given power, in case of failure to secure a parlimentary majority, to dissolve the Hungarian Parliament and either issue writs for a new election or post-pone elections until after the war.

The Socialist Vienna *Arbeiter Zeitung* turned strongly anti-imperialist and ridiculed the device of solving the crisis by proroguing Parliament. Reports from Germany of May 9 stated that this paper for two weeks had been barred from Germany.

Amsterdam, May 9.—Austria-Hungary, says one German journal, is "heading for disaster," while another declares that the country is going at ever-increasing speed toward a catastrophe. The *Kreuz Zeitung* says that Kaiser Charles' realm is "being shaken by a severe crisis, which this time goes far beyond parliamentary limits."

It is significant that the Vienna *Neue Freie Presse* is calling for energetic measures against the Southern Slav "menace," and that it views the political co-operation between the Southern Slavs and the Czechs with considerable alarm and as a danger to the monarchy. The tone of the article would suggest a situation on the southern confines of the dual monarchy infinitely more serious than is imagined by the public.—*N. Y. Times*, 10/5.

PRUSSIAN FRANCHISE REFORM HINDERED.—Reactionary elements in both the Upper and Lower Houses of the Prussian Parliament have adopted various devices to delay or emasculate the Franchise Reform measure approved by the Kaiser in his rescript of July last. A motion to restore the paragraph providing equal suffrage, which had been removed in committee, was twice defeated in the Lower House.

REFORM MOVEMENTS IN EUROPE.—With Prussian electoral reform hanging in the balance, a review of recent democratic progress in other parts of Europe shows how strikingly Germany will contrast with her neighbors if the clock is set back, not forward. We may put Russia to one side. Sweden has just seen the downfall of the Conservative Ministry because it would not consent to a revision of the constitution; the new ministry is a reform ministry, and the King's speech at the opening of the Riksdag, which included mention of woman suffrage and equality in the communal franchise, declared the necessity of "strengthening our people through extended political rights and far-sighted social reforms." During the war Denmark has completed the democratization of her constitution. In Holland universal suffrage has been adopted under a plan which at last separates the voters' roll from the tax roll. In Rumania, Premier Bratiano announced last May the government's decision in favor of universal suffrage and other reforms, and when peace is fully restored there is little doubt that just changes urged since the Congress of Berlin will be made. The struggle for universal suffrage in Hungary is steadily pushing the opposition back. Junkers like Count Spee may talk defiantly, but if they will only look outside their chamber they will realize—even thrusting the issue of the war out of consideration—what a Mrs. Partington rôle they play.—*N. Y. Nation*, 11/5.

SIGNIFICANCE OF THE LICHNOWSKY MEMORANDUM

In the summer of 1916 Prince Lichnowsky, German Ambassador to England from 1912 to 1914, prepared a secret memorandum giving his version of Anglo-German relations and negotiations up to the outbreak of war.

Several copies were prepared for private circulation, and by what the Prince later described as an "unprecedented breach of confidence" these reached a wider circle and fell into the hands of the Stockholm Socialist paper *Politiken*, which began their publication on March 15. A furious debate arose in the Reichstag next day, and before the close of the month much of the memorandum appeared in the Berlin *Vorwärts* and Münchner *Neueste Nachrichten*. The complete document appeared in the N. Y. *Times* of April 21 and in the May *Times Current History*.

Whether or not their publication in Germany at this time is contrary to the devious policy of the German Government, and if not what the motive for their publication may be, are matters for speculation. Efforts to overthrow the facts stated have at all events been feeble. The memorandum is undoubtedly the work of a German strongly favoring an understanding with Great Britain before the war, not fully in the secrets of the inner circle at Berlin, and humiliated and disgusted by the complete overthrow of his work in London. Incidentally, it should be noted that his Counsellor of the Embassy was von Kühlmann, the present Foreign Minister.

The memorandum almost completely substantiates the allied version of events preceding hostilities. It shows that Great Britain was on the point of concluding with Germany an agreement very favorable to Germany regarding the Bagdad Railway and Portuguese colonies in Africa; that Sir Edward Grey worked sincerely for peace throughout; and that "a hint from Berlin" would have led Austria to accept Serbia's reply.

Some of the striking statements in the memorandum are the following:

"We (the Germans) had always backed horses which it was evident would lose."

"Trade jealousy, so much talked about among us, rests on faulty judgment of circumstances."

"On Aug. 2 (1914), when I saw Asquith in order to make a final attempt, he was completely broken, and, although quite calm, tears ran down his face."

"Of course it would only have needed a hint from Berlin to make Count Berchtold (Austrian Foreign Minister in August, 1914) satisfy himself with a diplomatic success and put up with the Serbian reply."

"The impression became ever stronger that we (Germany) desired war in all circumstances."

"Thus ended my London mission. It was wrecked not by the perfidy of the British, but by the perfidy of our policy."

"I had to support in London a policy which I knew to be fallacious. I was punished for it, for it was a sin against the Holy Ghost."

"As appears from all official publications, without the facts being controverted by our own White Book, which, owing to its poverty and gaps, constitutes a grave self-accusation:

"1. We encouraged Count Berchtold to attack Serbia, although no German interest was involved, and the danger of a world war must have been known to us—whether we knew the text of the ultimatum is a question of complete indifference.

"2. In the days between July 23 and July 30, 1914, when M. Sazonoff emphatically declared that Russia could not tolerate an attack upon Serbia, we rejected the British proposals of mediation, although Serbia, under Russian and British pressure, had accepted almost the whole ultimatum, and although an agreement about the two points in question could easily have been reached, and Count Berchtold was even ready to satisfy himself with the Serbian reply.

"3. On July 30, when Count Berchtold wanted to give way, we, without Austria having been attacked, replied to Russia's mere mobilization by sending an ultimatum to St. Petersburg, and on July 31 we declared war on the Russians, although the Czar had pledged his word that as long as negotiations continued not a man should march—so that we deliberately destroyed the possibility of a peaceful settlement.

"In view of these indisputable facts, it is not surprising that the whole civilized world outside Germany attributes to us the sole guilt for the world war."

"And what result have we to expect from the struggle of people? The United States of Africa will be British, like the United States of America, Australia, and Oceania; and the Latin States of Europe, as I said years ago, will fall into the same relationship to the United Kingdom as the Latin sisters of America to the United States. They will be dominated by the Anglo-Saxon; France, exhausted by the war, will link herself still more closely to Great Britain. In the long run, Spain also will not resist.

"In Asia, the Russians and Japanese will expand with their limitations and their customs, and the South will remain to the British.

"The world will belong to the Anglo-Saxon, the Russian, and the Japanese, and the German will remain alone with Austria and Hungary. His sphere of power will be that of thought and trade, not that of the bureaucrats and the soldiers. The German appeared too late, and the world war has destroyed the last possibility of catching up the lost ground, of founding a Colonial Empire."

GERMAN CONTROL IN RUSSIA

GERMAN PRESSURE ON THE MOSCOW GOVERNMENT.—According to a London statement of May 12, the Russian Foreign Minister, M. Tchitcherin, had dispatched a wireless message to the Russian Ambassador in Berlin, M. Joffe, to "try to obtain from Berlin a cessation of every kind of hostility." Other messages assured Germany against hostilities on the part of the Russian Black Sea fleet, which was then at Novorossysk, on the east coast of the Black Sea; and protested against the closing of the Ukrainian frontier to Ukrainians.

Washington, May 14.—Secretary Lansing to-day received from American Minister Morris at Stockholm an unconfirmed Swedish report that Germany had served an ultimatum on the Soviet Government demanding, among other things, the occupation of Moscow and other large Russian cities.

"Swedish press reports from Moscow," said the dispatch, "state that Count von Mirbach recently transmitted to the Commissariat of the People a note formulated as an ultimatum and demanding the immediate effecting of certain financial measures which would practically make Russia a German colony.

"The chief points of the note were the immediate solution of the question regarding the exchange of prisoners, the complete abolishment of armaments, and the dissolution of units formed recently; also the occupation of Moscow and some other large Russian cities."

No confirmation of this report, however, has been received by the State Department through any official source.—*N. Y. Times*, 15/5.

This report was in some measure confirmed by dispatches of May 16 to the effect that Russians were disposing of securities, bonds, control of financial institutions, etc., to Germans at bargain prices.

LITHUANIAN "INDEPENDENCE".—Amsterdam, May 14.—Emperor William has issued a proclamation concerning Lithuania in which he says it is assumed Lithuania will participate in the war burdens of Germany. The

"independence" of Lithuania, allied with the German Empire, is recognized.

The proclamation, according to the *Rheinische Westfälische Zeitung*, carries the following preamble:

"We, Wilhelm, by God's grace, German Emperor, King of Prussia, etc., hereby make known that whereas the Lithuanian Landsrat, as the recognized representative of the Lithuanian people, on Dec. 12 announced the restoration of Lithuania as an independent state allied to the German Empire by an eternal, steadfast alliance, and by conventions chiefly regarding military matters, traffic, customs, and coinage, and solicited the help of the German Empire: and,

"*Whereas,* Further previous political connections in Lithuania are dissolved, we command our Imperial Chancellor to declare Lithuania on the basis of the aforementioned declarations of the Lithuanian Landsrat, in the name of the German Empire, as a free and independent state, and we are prepared to accord the Lithuanian State the solicited help and assistance in its restoration,

"We assume the conventions to be concluded will take the interests of the German Empire to account equally with those of Lithuania and that Lithuania will participate in the war burdens of Germany, which secured her liberation."

Washington, May 14.—Emperor William's proclamation was received to-day with no enthusiasm by officers at the Lithuanian National Council headquarters here.

"The assumption that Lithuania 'will participate in the war burdens of Germany' means a contribution of three things—money, munitions, and men," the officers declared. "The first we have not, as Germany has already impoverished us; the second we have no means of supplying, because we lack the first. Therefore Germany can have reference only to men. Men from a self-declared democracy to fight in the ranks of autocracy? Unthinkable! Lithuania would not consent. Are her citizens to be dragooned into the ranks of the Kaiser? That would be an abridgement of the sovereignty which Germany has already recognized, for Chancellor Hertling's reply stated, 'We hereby recognize Lithuania as free and independent.'"—*N. Y. Times*, 15/5.

REPUDIATES GERMAN RULE.—Washington, April 20.—The Provisional Government of Esthonia has published a protest against the recent German intrigue in that country, according to an official dispatch from France to-day, and has denounced the Diet of Livonia, Esthonia and Riga, which asked for a union with Prussia.

The protest is quoted by the dispatch in part as follows:

"As delegates of the Provisional Government of the Esthonian republic, we declare that the resolution is a falsification of the opinion of the Esthonian nation and can only be the expression of an insignificant minority composed of the German nobility and their partisans. The representatives of the Esthonian nation were not present at the assembly, having been replaced by substitutes of Esthonian origin, but deprived of all authority and not enjoying the confidence of the majority of the population, as well as by other elements and other persons introduced by the German military authorities."

The protest concludes, the dispatch said, with the assertion that the majority of the Esthonian nation would never submit to the decisions of the Diet of Riga, which it repudiates as worthless and illegal.—*Baltimore Sun*, 21/4.

LORD CECIL ON GERMAN PLANS.—London, May 3.—Lord Robert Cecil discussed to-day the expected German peace offensive, and said that he looked for it as part of their regular war plan.

"It will be meant mainly for internal consumption," he said. "Of course, it has proved futile to prophesy in this war, but I believe that the German

general plan is, supposing that they cannot win a decisive victory over the Allies, to go on fighting in the West until they have acquired complete commercial hold over the East. If they once really establish themselves in Russia, there is no reason why they should not fight the whole world forever."

Asked if he included in the German plans the use of Russia's man power, Lord Robert said that he did not expect that immediately, but it might come later. He went on to say that these grandiose plans depended on many things, and the German Government's great object in launching a peace offensive at this time was to induce its own people to carry on from week to week and month to month, in the belief that peace was almost in sight, until its Russian plans were matured. He continued:

"The peace offensive, I believe, will be directed very largely against England. They will put out offers which they think will be attractive to this country."

He then explained his idea of the German tactics. First, there was in the German newspapers a great outburst of Pan-Germanism, which was permitted, if not encouraged, by the government. Then, when the German peace offers are made, perhaps to England, they will be so much less than what the Pan-Germans have claimed that the government will be able to appeal to its people to admire its moderation. Meanwhile, in case something might come of its move, it has permitted the circulation of the Lichnowsky memorandum and has paid official tribute to the bravery of the British troops, to lessen the bitterness of feeling against England."—*N. Y. Times*, 4/5.

GERMANY OVERTHROWS UKRAINIAN RADA.—While events in Ukraine have not been fully reported, it appears that on April 25, the German authorities, under cover of a so-called revolt, dissolved the Ukrainian Central Rada, arrested and searched many members of the Rada and the Ukrainian Cabinet, and on the next day set up a new government completely under German control. This government was headed by a Russian named Skoropadski, who proclaimed himself "Hetman" with supreme power and formed a ministry of former bourgeois politicians favoring Germany as against the Bolsheviki. Skoropadski had formerly been a page to the Dowager Empress Marie Feodorovna, and it was later reported that she and the Grand Duke Dmitri Pavlovitch took part in the coup d'état and had arrived at Kiev. General von Eichorn, the German military authority, proclaimed military rule and continued arrests of those opposed to the new government.

Correspondents opposed to Bolshevik rule in Russia inclined to a favorable view of the patriotism of the new cabinet. On the other hand Mr. Arthur Ransome wrote on May 9 as follows:

"According to my information, Skoropadski, before the beginning of the negotiations with Great Russia, will invite her representatives to change the present government, meaning thereby probably not merely a change of persons but of the general political coloring of the ministry."

Should this be so, it will be yet another proof that the interests of the Allies coincide with those of the Soviet Government.

The official *Izvestia* says:

"Each new act of the German Government in connection with Russia merely deepens the gulf between Germany and her eastern neighbors. The German military party is preparing for itself irreconcilable enemies in the East and not making friends in the West."

I believe that is absolutely true, and that Germany, step by step, is increasing her own difficulties in Ukraine. The burgeois Rada, for example, had guaranteed by the peace agreement to supply 30,000,000 poods of corn to

the Central Powers before May 1. Owing to the passive and sometimes active resistance of the peasants they succeeded in only supplying 3,000,000. That is to say, that for the betrayal of the Russian revolution the German people so far have received less than 1 pound of flour all round.

Later lists of the ministers of the cabinet of the autocratic Hetman differ in detail from the list cabled Tuesday, but the main characteristic of all lists is the same. It is made up of cadets and members of political groups even further right. It is committed to a germanophile policy.

The German declaration asserts that the Rada had no base of popular support and no authority, since its was unable to free the banker Dobry, who was arrested by an anti-German society. The Germans promise to give all possible support to Skoropadski against revolts, which they evidently consider probable.—*N. Y. Times*, 11/5.

RUMANIAN PEACE TREATY

RUMANIAN PEACE TREATY SIGNED.—The peace treaty between Rumania and the Central Powers, to be called the "Peace of Bucharest," was signed on May 6. By the treaty Rumania concedes to Austria "frontier rectifications" requiring the cession of some 3000 square miles of territory on the Transylvanian border, control of the Danube by the Central Powers along its entire length, cession to Bulgaria of all the Dobrudja gained by the treaty of Bucharest in 1913, and German control over Rumanian oil fields.

A summary of the treaty follows:

Clause 1.—Re-establishment of Peace and Friendship.—Germany, Austria-Hungary, Bulgaria and Turkey, on the one hand, and Rumania on the other, declare the state of war ended and that the contracting parties are determined henceforth to live together in peace and friendship.

Diplomatic and consular relations between the contracting parties will be resumed immediately after the ratification of the peace treaty. The admission of consuls will be reserved for a future agreement.

The remaining clauses may be summarized as follows:

Clause 2.—Demobilization of the Rumanian Forces.—The Rumanian Army, except four divisions in Bessarabia, to be reduced to a peace basis; surplus munitions and guns to be guarded by Rumanian troops under supervision of the allied (German) command; naval forces to be reduced to a peace basis, after a settlement in Bessarabia, except as employed for river police and protection of navigation on the Black Sea.

Clauses 3-5.—Cessions of Territories.—Cession to Bulgaria of that part of Dobrudja taken from Bulgaria in 1913, and to the Central Powers of the remainder of Dobrudja to the St. George branch of the Danube mouth; frontier rectifications in favor of Austria as indicated on map; mutual renunciation of indemnities for war costs; an army of occupation at the expense of Rumania.

Clause 6.—Navigation on the Danube.—The Danube Commission to comprise only representatives of states situated on the Danube or the European coasts of the Black Sea, and to control the Danube from Braila downward. Rumania to guarantee free navigation of the Danube to ships of the other contracting parties.

The peace was hailed with joy in Germany as "The petroleum peace." "A land of bread and oil," said *Germania*, "will be provided for Central Europe.

BESSARABIA ANNEXED TO RUMANIA.—Washington, April 22.—The union of Bessarabia with Rumania is "definitive and indissoluble," according to information submitted to the State Department to-day by the Rumanian

Legation. The Rumanian Minister, Dr. Constantin Angelesco, has resigned, and the communication was delivered to the department by the Chargé d'Affaires, N. H. Lahovary, as follows:

"On April 9 the National Assembly of Bessarabia voted by 86 against 3 for union of Bessarabia to Rumania. The Rumanian Premier was then at Kishinov (capital of Bessarabia) and took cognizance of the vote amid enthusiastic acclamation and declared this union to be definitive and indissoluble.

"Bessarabian delegates went to Jassy on April 12 to present the homage of the people of Bessarabia to their Majesties the King and Queen of Rumania. A Te Deum was sung at the cathedral in the presence of the royal family, the government and the Bessarabian delegates.

Bessarabia, according to Mr. Lahovary, has about 3,000,000 inhabitants, and more than three-fourths of these are Rumanians. "Bessarabia," he continued, "is one of the richest farm lands of what was formerly Russia. The Bolsheviki ravaged it frightfully during the winter months, and the country was only saved by the Rumanian troops, who were called in by the Bessarabians. Because of this help the Bolsheviki declared war on Rumania, and there were violent clashes between the Bolshevist brigands and Rumanian troops. Finally the latter ousted the Bolsheviki and succeeded in restoring tranquillity, but only after the Bolsheviki had committed most frightful outrages and pillaged the country.

"If Rumania was obliged to make peace, it was due directly to the attitude of the Bolsheviki toward Rumania."—*N. Y. Times*, 23/4.

RUMANIA MUST SELL TO GERMANY.—Amsterdam, May 14.—A Vienna dispatch says that a special economic treaty between Rumania and the Central Empires provides that Rumania will sell to Germany and Austria-Hungary her surplus production in 1918 and 1919 of all kinds of grain, including oil, seeds, and also fodder, pulse, poultry, cattle, fibrous plants, and wool. Rumania also agrees to sell this surplus to the Central Powers for a further period of seven years, if it should be required.—*N. Y. Times*, 15/5.

FINLAND AND RUSSIA'S ARCTIC PORTS

GERMANY AND FINLAND.—The Stockholm correspondent of the London *Times*, writing on March 6, gives the following explanation of the situation in Finland. When Finland asserted her independence, Sweden and the Scandinavian states were the first to give recognition. At the same time, the Aland islanders demanded annexation by Sweden, and King Gustav gave every encouragement to this demand, seeing in Finland as a buffer state and the Aland Islands linked to Sweden, a realization of the aims of Swedish diplomacy.

When a "Red" or Bolshevik revolt broke out against the Finnish Republic, a strong appeal was sent to Sweden for help. Sweden refused, but offered mediation between the Red and White forces, which was accepted only by the Aland islanders. A small Swedish force was sent to the islands, and the Red and White armies agreed to evacuate and leave the disposition of the islands to the peace settlement.

In Finland itself, however, the government made little progress against the Reds. As a last resort an appeal was made to Germany, which at once sent a consignment of arms (Japanese rifles captured in Russia) and a strong naval expedition. The first measure of this force was to establish a base in the Aland Islands, Germany at the same time assuring Sweden that the future of the islands would be settled later by agreement among the

Baltic powers alone. Germany's advantage in the northern Baltic was thus secured through Sweden's policy of non-intervention.

CONTROL OF RUSSIA'S ARCTIC PORTS.—A Moscow dispatch of April 14 stated that 6000 allied troops had been landed at Murmansk to aid in protecting the railroads from the interior of Russia to the sea outlets on the northern coast. Germany, according to a dispatch of April 23, protested to Russia against this action, on the ground that it was a violation of the Brest-Litovsk treaty and that the presence of troops on the Finnish frontier threatened the safety of Finland.

During May, German papers dwelt on Great Britain's alleged plans to take possession of Kola Bay (the harbor of Murmansk), and Finnish Activist papers strongly advocated the conquest of Karelia and even the occupation of Petrograd.

A delayed dispatch from Moscow has revealed the fact that British and French troops have been landed on the Kola Peninsula to aid Russians in protecting the railroads from the interior of Russia to the two main sea outlets in the north—Murmansk and Archangel. Arrows on the above map point to Murmansk, on the Arctic Ocean, where the allied troops were landed and to Kem, where Finnish White Guards, attacking the railway line to Murmansk, were repulsed by the entente forces.—*Baltimore Sun*, 22/4.

ALLIED MEASURES IN THE FAR EAST

MILITARY AGREEMENT BY CHINA AND JAPAN.—Dispatches from China in April gave varied accounts of military negotiations between China and Japan. In the first issue of the Shanghai *Gazette* on April 24 it was stated that these demands were more serious than Japan's demands in 1915, and involved Japanese command of Chinese forces sent into Siberia, Japanese organization of Chinese police, Japanese control of arsenals and dockyards, and special privileges in mining, financial aid, and educational administration.

Washington, May 18.—Official information of the conclusion of a treaty between the Japanese and Chinese Governments for a defensive alliance against Germany has been received at the State Department from Paul S. Reinsch, the American Minister at Peking. Little is known of the details of the agreement, of which it is said generally that it was entered into for the purpose of mutual protection for the duration of the great war.

Although it is not known whether the United States and other allied governments were consulted, it would be a mistake to say that they were not informed of the negotiations of the treaty, which probably marks the beginning of a far-reaching policy that may lead to allied action designed to check the free hand which Germany has assumed in Russia.

While apparently intended primarily to provide against Bolshevist aggressions in Manchuria and other menacing activities of the present ruling faction in Russian territory, the treaty makers are supposed to have had an eye to possible German advance into Siberia through propagandist methods.—*N. Y. Times*, 19/5.

JAPAN AND UNITED STATES IN CONCERT.—Tokio dispatches of April 24, announced the resignation of Viscount Motono, Japanese Minister of Foreign Affairs, and the appointment in his place of Baron Goto. It was stated that the resignation resulted from the arrival in Tokio of the Japanese Ambassador to Russia, Baron Uchida, who opposed a campaign in Siberia and was supported by the Premier.

Baron Goto dispatched to Secretary Lansing a message, appearing in the press on May 8, as follows:

Charged with the direction of foreign affairs in this ministry, owing to the regrettable illness and retirement of Viscount Motono, I need hardly assure you of as firm a determination as ever of this government to promote and cement in every possible way the relations of mutual regard and confidence between our two nations, holding implicit faith in the final victory of our common cause to which we are unalterably committed. I am indeed proud of the privilege that is afforded me of associating myself with you in the great task before us.

Secretary Lansing's reply, also made public at the State Department to-day, follows in part:

I have read with gratification your telegram of yesterday, which expresses so frankly the spirit of goodwill for this country and of devotion to the common cause to which we are pledged.

It is needless to assure your Excellency that your words of confidence and esteem are fully reciprocated by this government. Candor and friendship in all our relations are our supreme wish and purpose; and we feel confident that, guided by this spirit, the United States and Japan will enjoy an even better understanding—if that is possible—than the understanding which to-day characterizes their intercourse.

UNITED STATES SUPPORTS CONSUL AT VLADIVOSTOK.—It was announced on April 26 that M. Tchitcherin, Russian Foreign Minister had requested the United States, Great Britain, and France to remove their consuls at Vladivostok as a result of alleged improper negotiations with the Siberian autonomous government and support of the counter-revolutionary movement. A protest was also addressed to Japan. This protest was concident with the arrival in Moscow of the German Ambassador, Count von Mirbach. It was regarded by the Allies as a device to force recognition of the Soviet Government.

Secretary Lansing received the protest on May 6, and on May 9 instructed Ambassador Francis to communicate informally a denial of the charges. Ambassador Francis had previously acted in the matter, as indicated by the following Moscow dispatch of April 28:

The Bolshevist demands on Ambassador Francis were: First, the removal of John K. Caldwell, American Consul at Vladivostok; second, investigation of his part in the alleged negotiations with the American Legation at Peking, and third, the attitude of the American Government toward the Soviet republic.

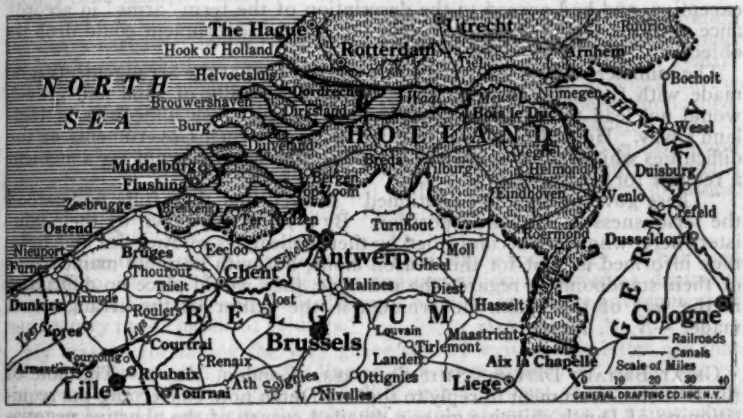
Ambassador Francis has sent a communication to the Bolshevist Government regarding the alleged participation of Americans, French, and British in a Siberian counter-revolt plot in connection with which the Bolsheviki put plainly the question of the recognition of their government. The American Embassy, the note says, carefully scrutinized the documents submitted by the Russian Government. In the American viewpoint, the documents failed to show any connection of American officials in these plots.

The American Embassy, the Ambassador continues, interprets the documents to show only that persons planning a counterrevolt contemplated asking the assistance of Consul Caldwell, Admiral Knight, and the representatives of the Allies in Peking, including the American Minister, but failed to show either the consummation of the hopes of the revolutonaries in this direction, or that the Americans participated or promised aid in any way. It is deemed unfortunate, in the present state of Russian international relations, that such flimsy charges should arise.

Official denial has been made by Japanese Consul Uyeda to the Russian Foreign Office to rumors that the Japanese are placing machine-guns in Vladivostok and are arranging to increase their forces there.—*N. Y. Times*, 5/7.

HOLLAND UNDER GERMAN PRESSURE

In October, 1917, Great Britain protested to Holland against Germany's use of Dutch canals to transport sand and gravel to Belgium, and also copper to be smelted in Belgium. It was contested that Germany's occupation of Belgium was for strictly military purposes, and that the sand and gravel were used for purposes of fortification. In July, 1916, Holland had restricted such transportation to 75,000 tons per month, but this was later increased to 450,000 tons per month.



HOLLAND—THE "NATURAL PROPERTY OF THE GERMAN EMPIRE."

So German Imperialists believe, because the mouths of the Rhine are in Holland; also an irksome wedge of Netherland soil in the south divides Belgium from Germany.

—*Literary Digest*, 11/5.

In April, 1918, following the allied seizure of Dutch ships, Germany renewed her pressure on Holland, demanding not only extension of the sand and gravel agreement but also the privilege of sending supplies over the Limburg railway to Antwerp. This demand was put practically in the form of an ultimatum, and Foreign Minister Loudon on April 25 declared the situation very serious. However, on May 5, Jonkheer Loudon announced that the tension was ended and that Holland had agreed to the transport of 1,600,000 tons of sand and gravel per annum for Belgian roads, without supervision of the use of such materials.

Explaining the strained relations on May 10, Foreign Minister Loudon said:

"The government's reasons for considering the relations which had arisen with Germany as strained lay in the emphasis with which the German Government made known what it demanded from the Dutch Government, some

parts of which demands were immediately seen to be unacceptable. Through her minister here, Germany gave both the Dutch Premier and the Minister of Foreign Affairs to understand that it was a matter which had not been decided without thorough consideration and must be accepted in its entirety as an irreducible minimum.

"The Dutch Minister at Berlin, in particular, was clearly told that if the German demands were not granted the consequences would be most serious for Holland.

"The question of the transit of sand and gravel had been regulated in a manner which encountered no fundamental objections on the part of the Dutch Government. On the other hand, the character of the goods to be transported over the Limburg Railway was in direct conflict with the actual wording of the Dutch proclamation of neutrality. The government decided, therefore, unhesitatingly to oppose this. It was only when the German Government had accepted transport of provisions for the army as the fourth exception, and had agreed to the description of the term 'arms' in accordance with the Dutch conception, that the Dutch Government could drop its objections."

The minister said he was sufficiently convinced that the arrangements now made with Germany respecting the transit, especially of sand and gravel, would not lead to the allied governments putting fresh difficulties in Holland's way. He had informed the British and French Governments of the difficulties which had arisen with Germany, although it was not for a moment a request for their approval.

"These governments," he continued "showed that they fully understood the seriousness of Holland's position. By a joint step taken by their ministers here, who were accompanied by their colleagues of America and Italy, they informed us that for this reason alone, but with absolute maintenance of their standpoint as regards the principle, they would place no difficulties in the way of the Dutch Government in the matter of the arrangements made."—*N. Y. Times*, 12/5.

GREAT BRITAIN DEFENDS SHIP SEIZURES.—London, May 1.—The note of the British Government in reply to the last Dutch note concerning the requisitioning of Dutch shipping gives a detailed survey of the abortive negotiations for an amicable arrangement for the use of Dutch shipping.

The note deals with the allegation of the Netherlands Government that the measure taken only rests on force and contends that the measure taken was simply an exercise of the universally recognized right of sovereignty.

The note concludes with an expression of the hope that the explanations given will remove from the mind of the Netherlands Government and the Dutch people any misconceptions regarding the proceedings of the associated governments, and that it will be realized that the latter have done everything in their power to render the action they were compelled to take, and which, in their opinion, is fully justified under international law, as little injurious as possible to the Netherlands interests.—*Washington Star*, 3/5.

GREAT BRITAIN

LLOYD GEORGE OVERCOMES ARMY OPPOSITION.—A political sensation, rather than a ministerial crisis, arose in England over a letter published in the London *Chronicle* of May 6 by General Maurice, former Director of Military Operations. From this office, which is in reality simply the link between the commanders in the field and the war cabinet, General Maurice had been removed several days before for an indiscreet and unjustified criticism of alleged French failure to support the British forces, in which Haig was compared to Wellington waiting for Blücher at Waterloo. The letter follows:

To the Editor of The Daily Chronicle:

My attention has been called to answers given in the House of Commons on April 23 by Mr. Bonar Law to questions put by R. C. Lambert, Colonel C. R. Burn, and W. M. R. Pringle as to the extension of the British front in France. Those answers contain certain misstatements which, in sum, give a totally misleading impression of what occurred. This is not the place to enter into a discussion as to all the facts, but Hansard's report concludes:

"Mr. Pringle—Was this matter entered into at the Versailles War Council at any time?

"Mr. Bonar Law—That particular question was not dealt with at all by the Versailles War Council."

I was at Versailles when the question was decided by the Supreme War Council, to whom it had been referred.

This is the latest of a series of misstatements which have been made recently in the House of Commons by the present government. On April 9 the Prime Minister said:

"What was the position at the beginning of the battle? Notwithstanding the heavy casualties in 1917, the army in France was considerably stronger on Jan. 1, 1918, than on Jan. 1, 1917. (Hansard, Vol. 104, No. 24, p. 1328.)"

That statement implies that Sir Douglas Haig's fighting strength on the eve of the great battle which began March 21 had not been diminished. This is not correct. Again in the same speech the Prime Minister said:

"In Mesopotamia there is only one white division at all, and in Egypt and Palestine there are only three white divisions. The rest are either Indians or mixed with a very small proportion of British troops in these divisions. I am referring to infantry divisions, Ibid., p. 1327."

This is not correct.

Now, Sir, this letter is not the result of a military conspiracy. It has been seen by no soldier. I am by descent and conviction as sincere a democrat as the Prime Minister, and the last thing I desire is to see the government of our country in the hands of soldiers.

My reasons for taking the very grave step of writing this letter are that the statements quoted above are known to a large number of soldiers to be incorrect, and this knowledge is breeding such a distrust of the government as can only end in impairing the splendid morale of our troops at a time when everything possible should be done to raise it. I have therefore decided, fully realizing the consequences to myself, that my duty as a citizen must override my duty as a soldier, and I ask you to publish this letter in the hope that Parliament may see fit to order an investigation into the statements I have made. I am, Sir, yours, faithfully,

F. MAURICE, Major General.

20 Kensington Park Gardens, May 6, 1918.

On May 7 Mr. Bonar Law announced in the House of Commons that the government proposed to ask two judges to act as a court to investigate the charges immediately. Mr. Asquith, leader of the opposition, offered on the day following a motion that the investigation be made by a Parliamentary Committee. To this the government objected on the ground of avoiding publicity and a prejudiced decision, and Mr. Lloyd George made an effective speech supporting the accuracy of his statements. The Asquith resolution was voted down by a majority of 293 to 106.

General Maurice was retired from the army and afterward accepted the position of military critic for the London *Daily Chronicle*.

GOVERNMENT ARRESTS SINN FEINERS.—London, May 18.—Five hundred Sinn Feiners were arrested at various towns in Ireland to-day, according to a Dublin dispatch to *The Evening News*.

"There have been no disturbances anywhere in the country, as far as is known here," says the dispatch. "Indeed, the most striking feature of the government's coup was its swiftness and thoroughness. All arrangements were carried through like clockwork, dumfounding the Sinn Feiners who boasted that the authorities were afraid to arrest Professor de Valera or any other leaders, and would meddle only with the smaller fry of the organization."

In no case, says the dispatch, was resistance offered to the police and soldiers who made the arrests. The Dublin offices of the Sinn Fein and the offices of the National Aid Fund were taken over by the military.

All the Sinn Fein members of Parliament have been arrested.

Dublin remains quiet, the correspondent adds, but there is a feeling of suppressed excitement.

Documents of great importance in connection with an Irish conspiracy have fallen into the hands of the government through the arrest by coast guards of a man with certain evidence upon him.—*N. Y. Times*, 19/5.

SPAIN

Upon the resignation of the Prieto Cabinet in Spain for the third and as it turned out last time on March 19, a period of confusion ensued in which no party leader would attempt to form a government. As a last resort, an "all star" combination was formed including Maura, Dato, Romanonis, Cambo, and Alba. It remains to be seen how this "regiment of generals" will work together.

The crisis which brought about the government downfall arose over the attempt of telegraph and postal employes to form a junta such as had been used with success by the army, and "hold up" the government for a sum of $750,000 within 24 hours. The government put the two services under military control and operation, with the result that both services fell into almost hopeless confusion.—Condensed from *Philadelphia Public Ledger*, 21/4.

LATIN-AMERICA

NICARAGUA AND GUATEMALA IN THE WAR.—Guatemala City, April 22.—The National Assembly at its session to-day declared the Republic of Guatemala to occupy the same position toward the European belligerents as does the United States. Guatemala broke off diplomatic relations with Germany in April, 1917.

San Juan Del Sur, Nicaragua, May 7.—Nicaragua to-day declared war on Germany and her allies. The declaration of war was adopted by Congress at the suggestion of President Chamorro, with only four dissenting votes.

Congress also adopted a declaration of solidarity with the United States and the other American republics at war with Germany and Austria, and authorized the President to take steps for utilization to a full measure of the nation's forces in the war.

Nicaragua is the twentieth nation which has declared war against Germany.—*N. Y. Times*, 8/5.

GUATEMALA-HONDURAS BOUNDARY ARBITRATION.—The special missions appointed by Guatemala and Honduras to settle the boundary controversy that has existed between the two countries for many years will arrive in Washington in a few days to begin their conferences through the mediation of the United States, the State Department announced to-day.

In January of this year, the United States Government suggested that each appoint a special plenipotentiary to proceed to the United States and settle the boundary dispute. Guatemala asked the United States to act as mediator. —*N. Y. Herald*, 28/4.

URUGUAY PUZZLED.—According to a statement from Montevideo on May 16, Germany had sent a message informing Uruguay that a state of war did not exist between the two countries. Uruguay's uncertainty arose from the action of a German submarine commander who took a Uruguayan military commission off a Spanish vessel and required pledges before allowing the commission to proceed.

Germany later relieved the commissioners of their pledges, but requested aid in securing passage across French territory of a Chilean mission to Germany. In response to an inquiry, Chile informed Uruguay that she had no desire that this mission should reach its destination.

U. S. IMPORTS FURTHER RESTRICTED

By order of the War Trade Board issued May 14, no licenses for imports to the United States may be granted by our consuls abroad until these licenses have been approved by the War Trade Board. The object of this measure is to prevent unnecessary shipments and to "give the War Trade Board an opportunity of passing upon all importations from a standpoint of enemy trade connection before shipments are put in transit."

REVIEW OF BOOKS

ON

SUBJECTS OF PROFESSIONAL INTEREST

"Field Artillery Officer's Notes." By Caldwell and Danford. $1.50 net. (New York: E. P. Dutton and Company.)

This notebook contains a considerable amount of important information relating to the administration, organization, transport, training and employment of field artillery.

The text is arranged to facilitate ready and convenient reference, and tables and formulæ have been included to facilitate the computation of firing data.

The methods employed to lay the guns by means of the map and compass are considered in much greater detail than is given to the subject in the Provisional Field Artillery Regulations, 1916, and it appears that the text follows to a considerable extent the methods employed by artillery in Europe in the present war.

With reference to the tables it is noted that in some cases the print is too fine, and in others, notably the table on page 67, the figures are too indistinct for convenience. Effort has apparently been made to crowd the tables, to accommodate one to the page, which is unfortunate; the type should be bold and distinct and easily readable even in a poor light. For this reason the tables should be given as much room as they require.

The form and size of the Note Book is also inconvenient to carry in the blouse pocket, and should be modified to make it handy for this purpose.

This book does not replace the Field Artillery Regulations; in fact there is no claim that it does. A thorough knowledge of the artillery regulations is necessary in any event, and the note book will be most useful to those officers who are familiar with the regulations. Young officers, particularly those who are inexperienced, are too prone to take for granted that a condensed book, such as the Field Note Book, contains all needful information on the subject.

W. P. U.

"Manual for the Use of Troops in Aid of the Civil Authority." By Babcock. Price $1.00 net. (New York: George H. Doran Company.)

This manual has been prepared specifically for use by the National Guard of New York State. Apparently all laws and statutes relating to the subject have been included, and several extracts from the Army Regulations also appear.

A considerable part of the manual relates to the provisions of the Penal Law and Code of Criminal Procedure, the laws of New York relating to the employment of the National Guard in aid of the Civil Authorities, and compensation and pensions; and consequently these provisions are for the

most part without authority as far as their employment by Federal troops, or the National Guards of other states is concerned.

Probably little relating to the tactical employment of troops on riot duty, not already known to well-informed officers, is contained in the manual.

The psychology of mobs, or mob spirit, which is a matter of considerable importance and should receive some consideration in any work relating to riot duty, has not been covered.

The book, like a number of others on the subject, prescribes that the bayonet should be used as a weapon in handling mobs, particularly during the early stages of a revolt. As a matter of fact it is a bad policy for infantry to come to close quarters with a mob. Unless in force they immediately lose the advantage that their discipline, arms and training give them, and could in many cases be overcome and disarmed by the mob. Cavalry is the arm for close contact with mobs, when it is necessary to come to grips with them.

The danger from the employment of explosives by rioters has been well emphasized in the text, but with regard to automobiles it would not appear that they are of special menace. Rioters as a rule do not own or control automobiles, and are seldom well organized enough to seize them in quantities. Motor cars, however, would be of considerable advantage to the troops and greatly extend their field of usefulness.

In general, while this book may appear to contain a number of unnecessary details and other irrelevant matter, a careful reading of the text will give a broadened grasp of the subject that is of value, particularly in the relations of the military with the civil authorities. W. P. U.

"Secrets of the Submarine." By Marley Frothingham Hay. Price $1.25 net. (New York: Dodd, Mead and Company.)

The author's purpose to write a book "for the benefit of the general public and in language which all could understand," has been very well carried out. He has described submarines, their operation, safety devices, etc., in non-technical terms entirely, and they can be easily understood even by a person whose only idea of a submarine is that it is a cigar-shaped object that goes under water and blows up ships. While written primarily for the layman, it will be of great interest to the naval service, especially the chapter "Sphere of the Submarine," which deals with the effect of the submarine on naval policies. The chapter "Submarine Antidotes" is also very interesting and will enlighten those who do not understand why naval operations against submarines, both at their bases and on the high seas, are not entirely successful. R. C. N.

"Health for the Soldier and Sailor." By Fisher and Fisk. (New York: Funk and Wagnalls Company.)

Thinking men of the country, realizing how human life was wasted by being unnecessarily cut short in peace times by ignorance and vicious modes of living, got together and evolved the Life Extension Institute, the principles of which, evolved and put into effect by medical and scientific men

for peace times, are now found to be far more important in war times. Never before in the history of the world has the maintenance of health been of so much importance, for now it means the conservation of energy expressed in man-power to be expended for the preservation of liberty and civilization, as the Allies understand it and are banded together to maintain it. In this book, "Health for Soldiers and Sailors," the authors, Fisher and Fisk, who are both representatives of the Life Extension Institute, have given a short and concise study of hygiene and its application to war conditions. In this they have been aided by members of the Hygiene Reference Board, which is composed of men at the top of their professions—it is the last word on the subject of health for our fighting men. The book is a veritable *multum in parvo*. From its size one would think that the subjects are only touched upon, but after reading it one is impressed with the amount of knowledge he has gained, and if he has the wisdom to make use of it, the days of the soldier and sailor will be happier and longer and far more useful to his country. Each subject treated should be emphasized, whether the habits of the man, the air he breathes, the food he eats, the water he drinks, or the poisons he should avoid. Special emphasis should be laid on the avoidance of the venereal peril. The damage from this peril is so real and so far-reaching, and has always been such a menace to the health of soldiers and sailors that they ought to know about it and fight it with all that is good and strong and self-respecting in them. Too much cannot be said to enlighten them on the subject of venereal diseases, for the subject is of vast importance in its bearings, whether social, economic or the conservation of man-power at this critical time. The book is an epitome, but is still further boiled down into fifteen Rules of Hygiene—it is worth knowing these for use in our daily lives. A. M. D. McC.

NOTICE

The U. S. Naval Institute was established in 1873, having for its object the advancement of professional and scientific knowledge in the Navy. It is now in its forty-fifth year of existence, trusting as heretofore for its support to the officers and friends of the Navy. The members of the Board of Control cordially invite the co-operation and aid of their brother officers and others interested in the Navy, in furtherance of the aims of the Institute, by the contribution of papers and communications upon subjects of interest to the naval profession, as well as by personal support and influence.

On the subject of membership the Constitution reads as follows:

ARTICLE VII

Sec. 1. The Institute shall consist of regular, life, honorary and associate members.

Sec. 2. Officers of the Navy, Marine Corps, and all civil officers attached to the Naval Service, shall be entitled to become regular or life members, without ballot, on payment of dues or fees to the Secretary and Treasurer. Members who resign from the Navy subsequent to joining the Institute will be regarded as belonging to the class described in this Section.

Sec. 3. The Prize Essayist of each year shall be a life member without payment of fee.

Sec. 4. Honorary members shall be selected from distinguished Naval and Military Officers, and from eminent men of learning in civil life. The Secretary of the Navy shall be, *ex officio*, an honorary member. Their number shall not exceed thirty (30). Nominations for honorary members must be favorably reported by the Board of Control. To be declared elected, they must receive the affirmative vote of three-quarters of the members represented at regular or stated meetings, either in person or by proxy.

Sec. 5. Associate members shall be elected from Officers of the Army, Revenue Cutter Service, foreign officers of the Naval and Military professions, and from persons in civil life who may be interested in the purposes of the Institute.

Sec. 6. Those entitled to become associate members may be elected life members, provided that the number not officially connected with the Navy and Marine Corps shall not at any time exceed one hundred (100).

Sec. 7. Associate members and life members, other than those entitled to regular membership, shall be elected as follows: "Nominations shall be made in writing to the Secretary and Treasurer, with the name of the member making them, and such nominations shall be submitted to the Board of Control. The Board of Control will at each regular meeting ballot on the nominations submitted for election, and nominees receiving a majority of the votes of the board membership shall be considered elected to membership in the United States Naval Institute."

Sec. 8. The annual dues for regular and associate members shall be two dollars and fifty cents, all of which shall be for a year's subscription to the UNITED STATES NAVAL INSTITUTE PROCEEDINGS, payable upon joining the Institute, and upon the first day of each succeeding January. The fee for life membership shall be forty dollars, but if any regular or associate member has paid his dues for the year in which he wishes to be transferred to life membership, or has paid his dues for any future year or years, the amount so paid shall be deducted from the fee for life membership.

ARTICLE X

Sec. 2. One copy of the PROCEEDINGS, when published, shall be furnished to each regular and associate member (in return for dues paid), to each life member (in return for life membership fee paid), to honorary members, to each corresponding society of the Institute, and to such libraries and periodicals as may be determined upon by the Board of Control.

The PROCEEDINGS are published monthly; subscription for non-members, $3.00; enlisted men, U. S. Navy, $2.50. Single copies, by purchase, 30 cents; issues preceding January, 1918, 50 cents.

All letters should be addressed U. S. Naval Institute, Annapolis, Md., and all checks, drafts, and money orders should be made payable to the same.

SPECIAL NOTICE

NAVAL INSTITUTE PRIZE ESSAY, 1919

A prize of two hundred dollars, with a gold medal, and a life-membership (unless the author is already a life member) in the Institute, is offered by the Naval Institute for the best essay on any subject pertaining to the naval profession published in the PROCEEDINGS during the current year. The prize will be in addition to the author's compensation paid upon publication of the essay.

On the opposite page are given suggested topics. Essays are not limited to these topics and no additional weight will be given an essay in awarding the prize because it is written on one of these suggested topics over one written on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. All essays published in the PROCEEDINGS during 1918, which are deemed by the Board of Control to be of sufficient merit, will be passed upon by the Board during the month of January, 1919, and the award for the prize will be made by the Board of Control, voting by ballot.

2. No essay received after November 1 will be available for publication in 1918. Essays received subsequent to November 1, if accepted, will be published as soon as practicable thereafter.

3. If, in the opinion of the Board of Control, the best essay published during 1918 is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention," or such other distinction as the Board may decide.

4. In case one or more essays receive "Honorable Mention," the writers thereof will receive a minimum prize of seventy-five dollars and a life-membership (unless the author is already a life member) in the Institute, the actual amounts of the awards to be decided by the Board of Control in each case.

5. Essays are limited to fifty (50) printed pages in the PROCEEDINGS of the Institute.

6. It is requested that all essays be submitted typewritten and in duplicate; essays submitted written in longhand and in single copy will, however, receive equal consideration.

7. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal.

By direction of the Board of Control.

G. M. RAVENSCROFT,
Lieut. Commander, U. S. N., Secretary and Treasurer.

TOPICS FOR ESSAYS

SUGGESTED BY REQUEST OF THE BOARD OF CONTROL

"Duties and Responsibilities of Subordinates with Special Reference to the Relations between Commanders-in-Chief and Chief of Naval Operations; Commanders-in-Chief and Force Commanders; Force Commanders and Division Commanders."

"Initiative of the Subordinate—Its True Meaning."

"Military Efficiency Dependent upon National Discipline."

"Governmental Organization for War."

"Naval Gunnery, Now and of the Future."

"Naval Policies."

"The Place of the Naval Officer in International Affairs."

"Moral Preparedness."

"Tact in Relation to Discipline."

"The Principles of Naval Administration in Support of War-Time Operations."

"What Steps in Organization and Training Should be Taken to Maintain and Increase the Efficiency of the Navy at the Close of the Present War."

"Responsibilities and Duties of Naval and Military Officers of the United States in Educating and Informing the Public on Professional Matters."

"A Commission in The Navy: Its Meaning and the Obligations Which It Involves."

"The Relations of an Officer to his Subordinate, Both Commissioned and Enlisted."

"The True Meaning of the Expression 'An Officer and a Gentleman.'"

LIST OF PRIZE ESSAYS

"WHAT THE NAVY HAS BEEN THINKING ABOUT"

1879

Naval Education. Prize Essay, 1879. By Lieut. Commander A. D. Brown, U. S. N.

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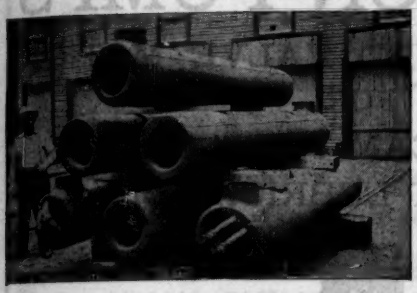

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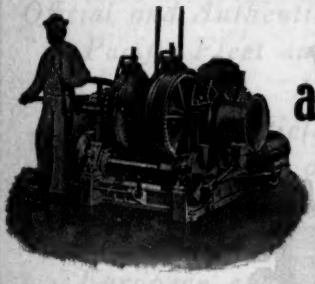

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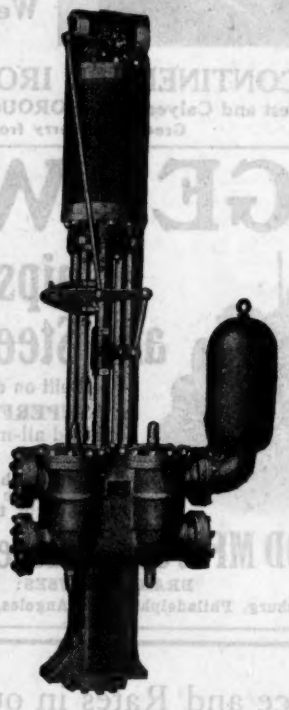

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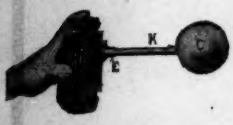

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